ZOOM
TECHNOLOGIES

MCSE

Microsoft Certified Solutions Expert

Course Presentation

Windows Server 2012

MCSE

(Microsoft Certified Solutions Expert)

Server Infrastructure

Course Presentation


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INTRODUCTION TO MICROSOFT CERTIFICATIONS
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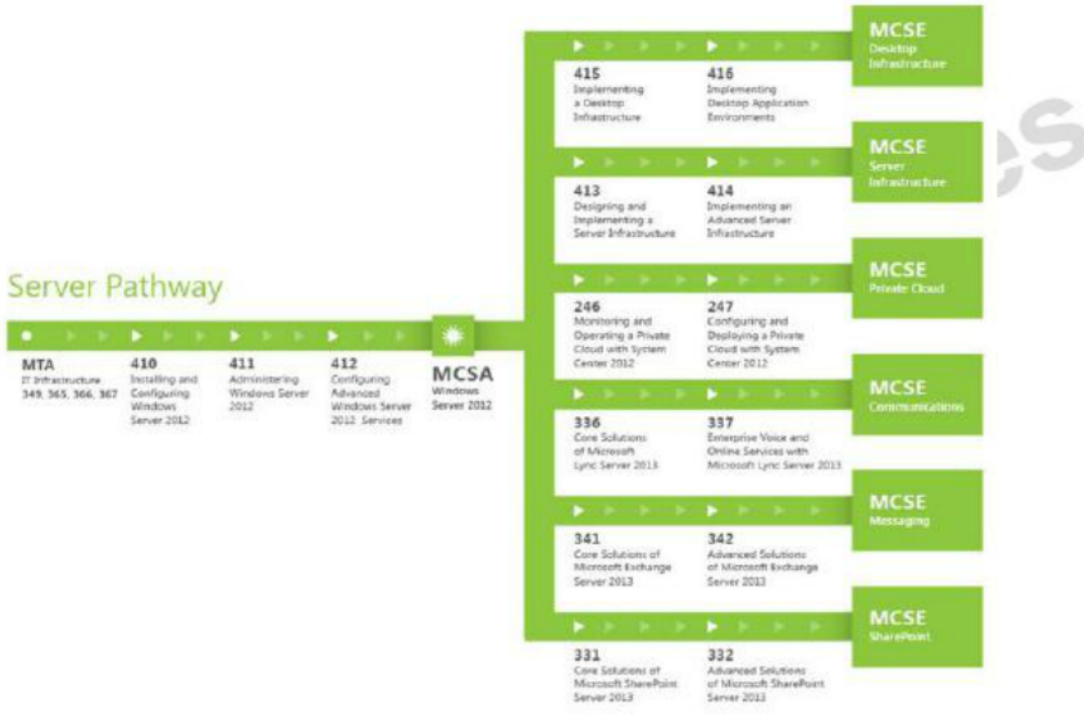
TECHNOLOGIES

Certification Paths



MCSA – Windows Server 2012

MCSE – Server Infrastructure

Reference Books

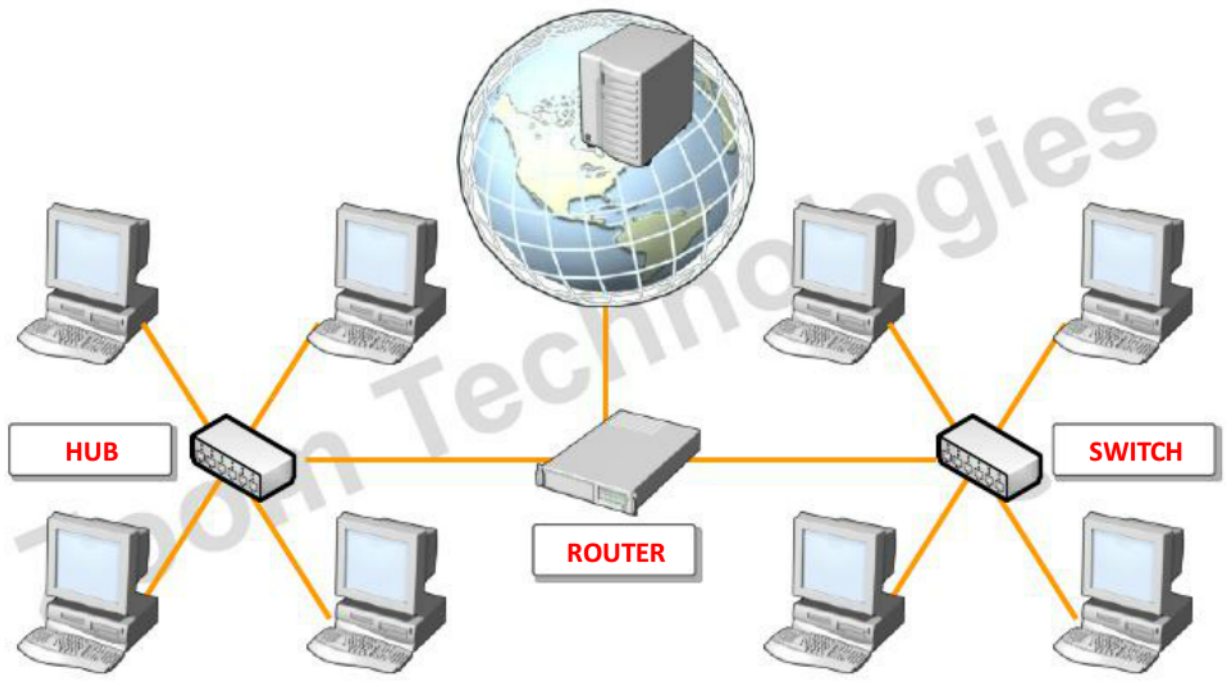
Exam Reference Guide – MS Press

- **70 – 410 – Installing and Configuring Windows Server 2012.**
- **70 – 411 – Administering Windows Server 2012.**
- **70 – 412 – Configuring Advanced Windows Server 2012 Services.**
- **70 – 413 – Designing and Implementing a Server Infrastructure.**
- **70 – 414 – Implementing an Advanced Server Infrastructure.**

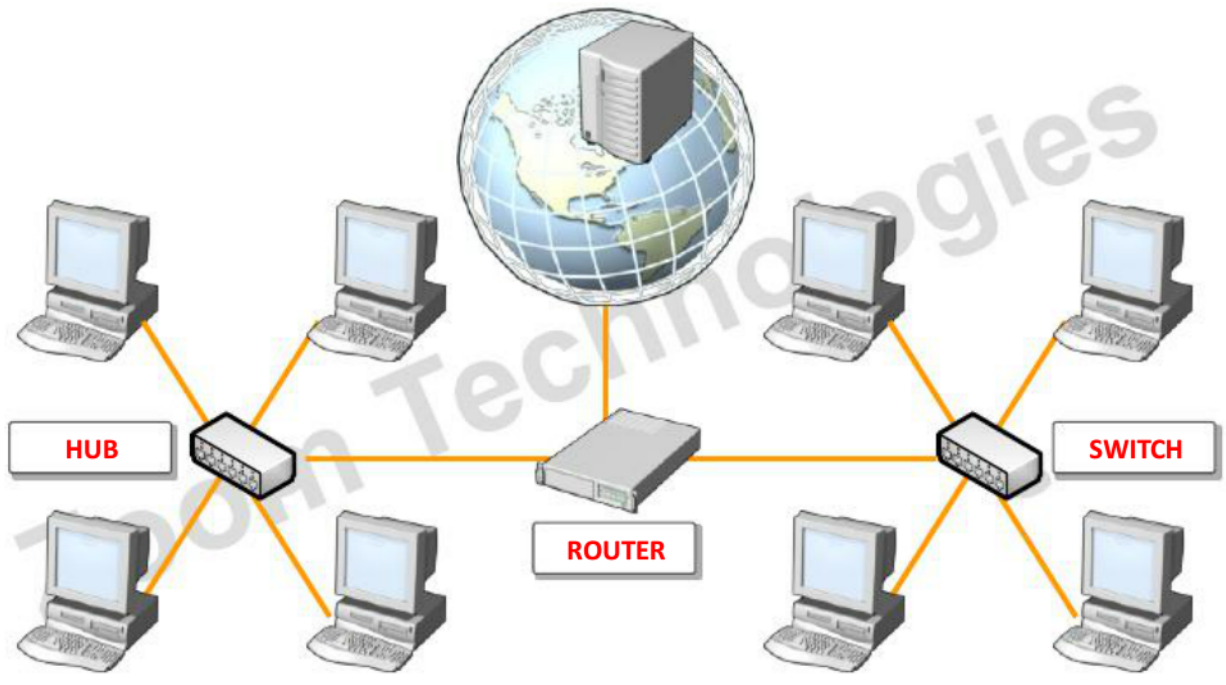
Network & Networking

- **Network**
  - A Network is an Interconnection of devices
- **Networking**
  - Networking is the communication between the interconnected devices

What is Network ?



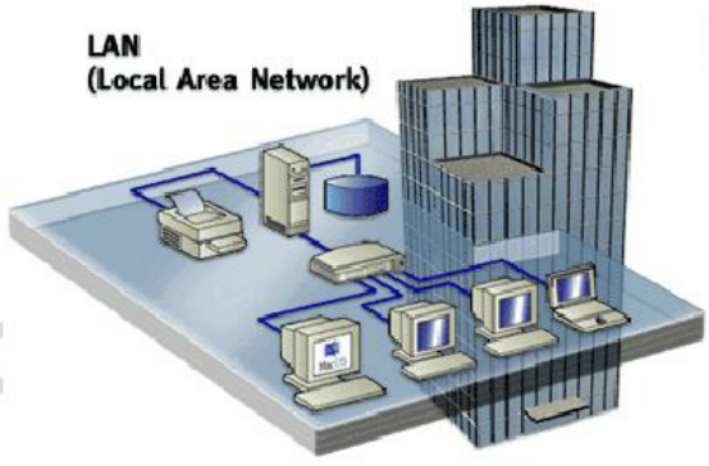
What is Networking ?



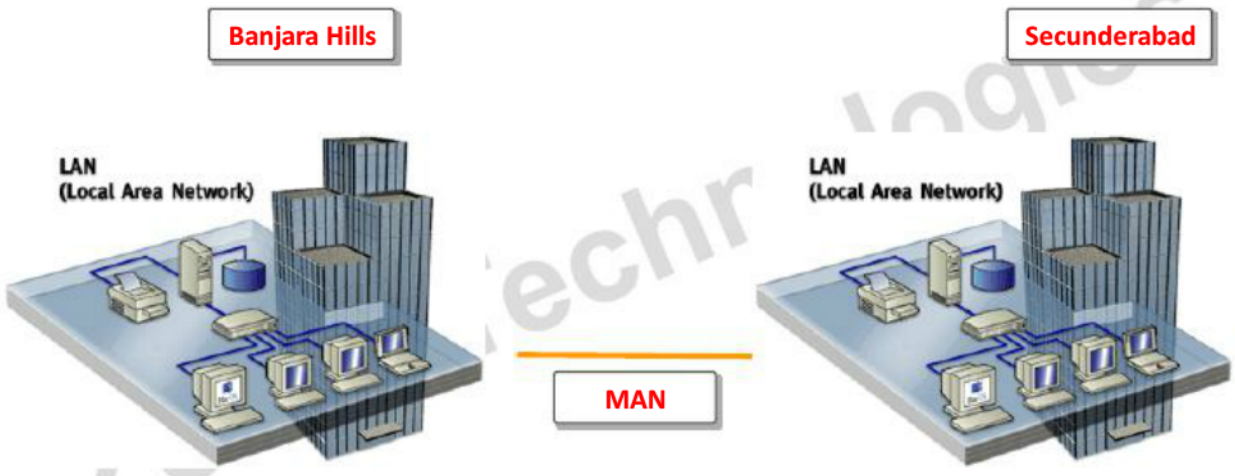
Types of Networks

- **Local Area Network**
  - Operate within a limited geographical location
  - Provides full-time connectivity to local services
- **Metropolitan Area Network**
  - Spans within a city
  - Provides full-time & part-time connectivity
- **Wide Area Network**
  - Operate over a large geographical location
  - Provides full-time & part-time connectivity

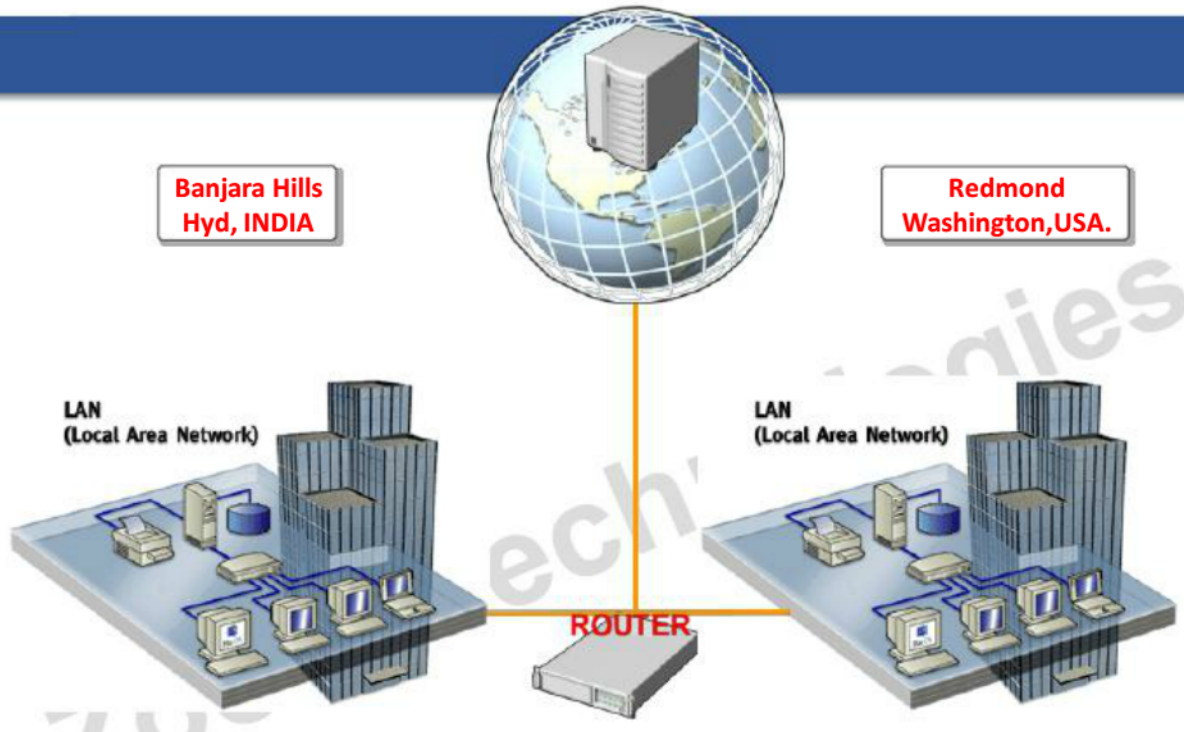
LAN


Banjara Hills
LAN
(Local Area Network)

MAN


Banjara Hills
Secunderabad
LAN
(Local Area Network)
LAN
(Local Area Network)
MAN

WAN



Network Devices

- **NIC**

  The Network interface card is frequently called a NIC. It forms an interface between the networked device (Computer) and the Ethernet (LAN).

- **MAC ADDRESS**

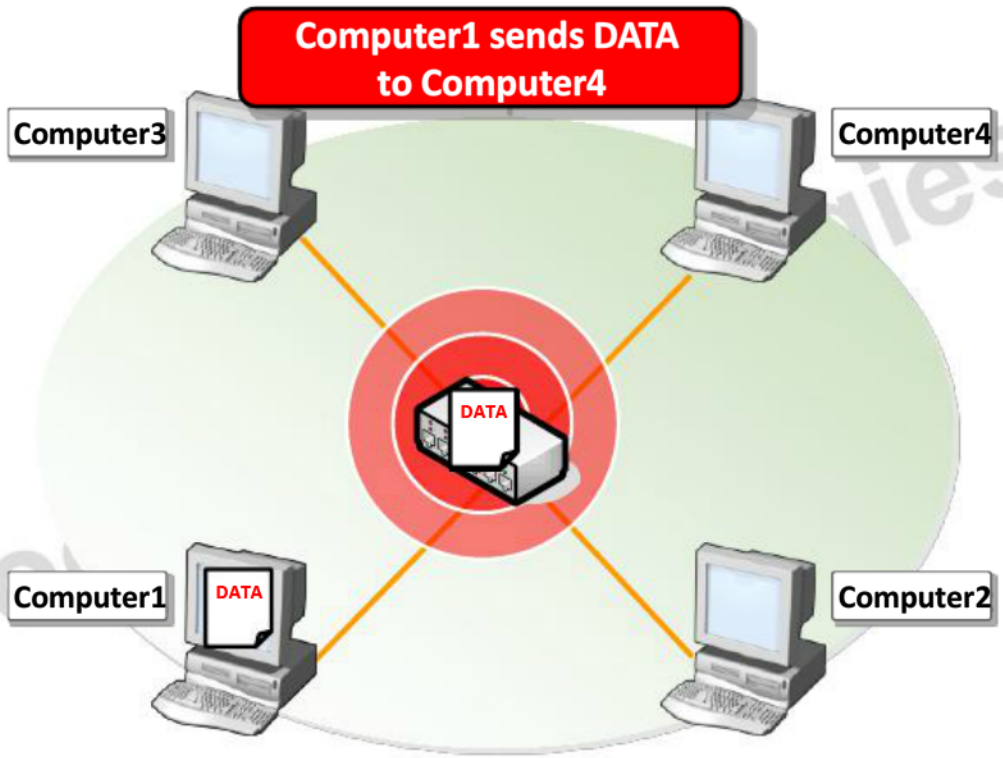
  A Media Access Control address (MAC address) is a unique identifier assigned to network interfaces for communications on the physical network segment.

  Example - 01-23-45-67-89-ab

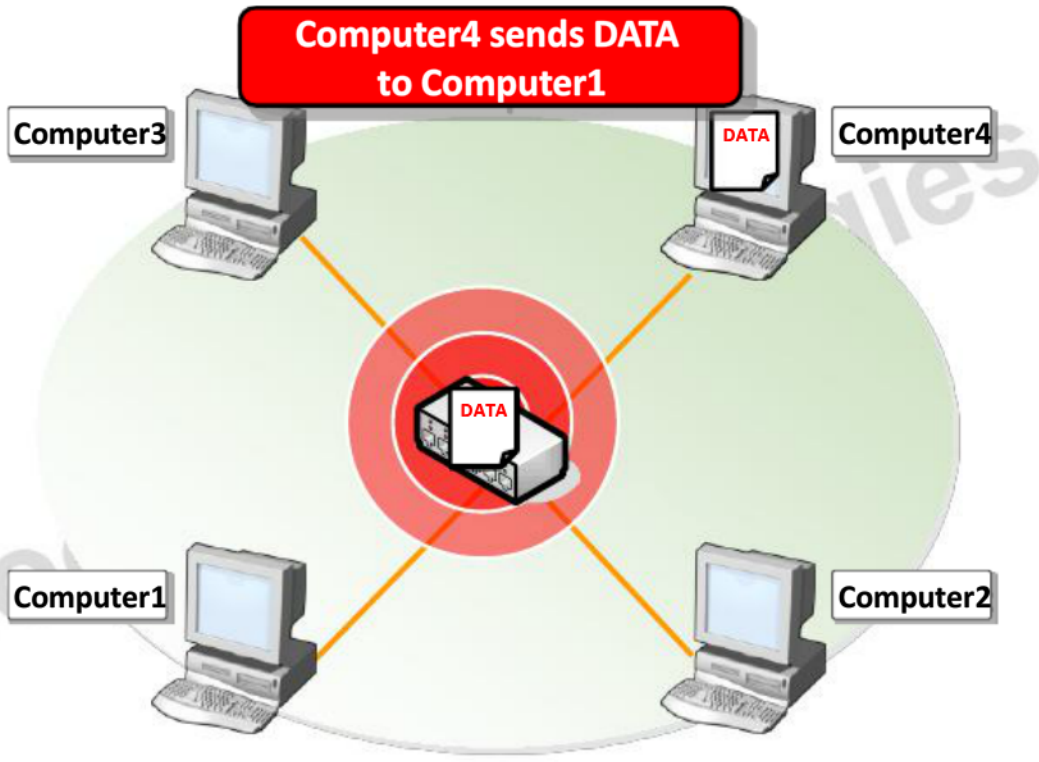
Network Devices

- **Hub**
  - It is generally used to connect all devices on a network so that they can communicate with each other. It always do broadcasting
- **Switch**
  - Like Hub, it is also used to connect all devices on a network so that they can communicate with each other. But first time it will do flooding and from second time onwards it will do unicast.
- **Router**
  - Router is device which allows communication between two or more different networks present in different geographical locations.

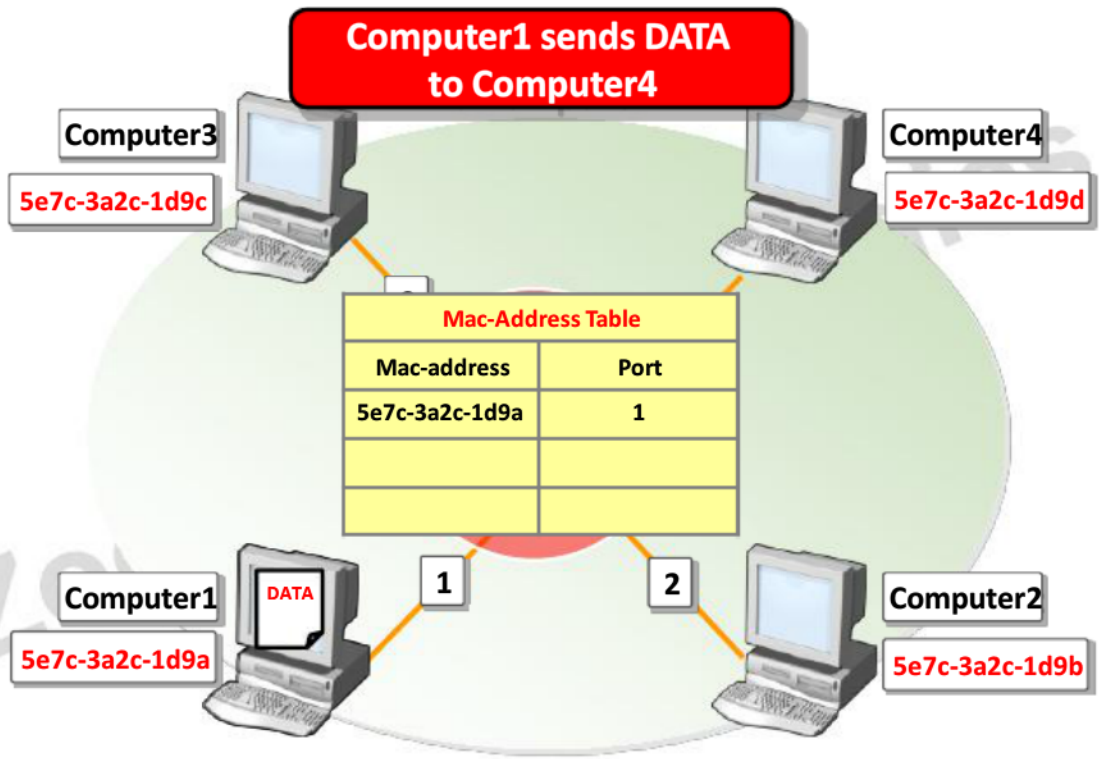
How Hub works ?



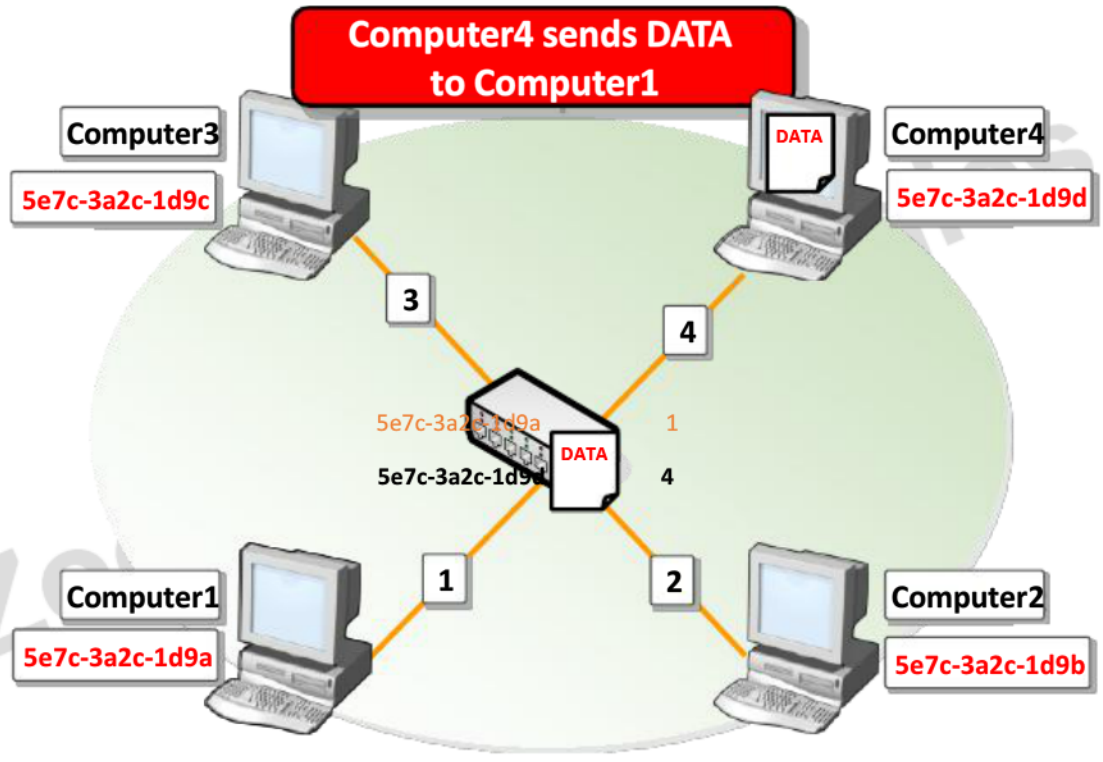
How Hub works ?



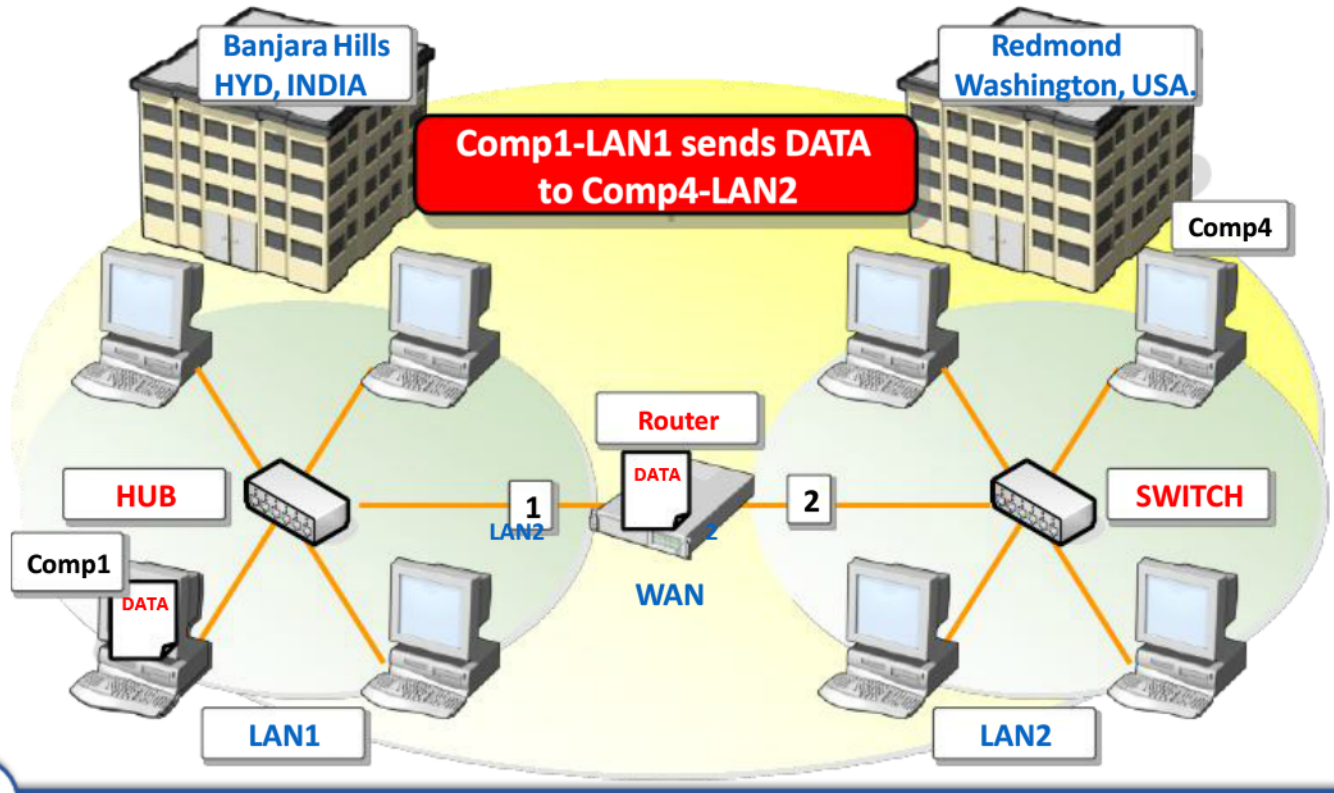
How Switch works ?



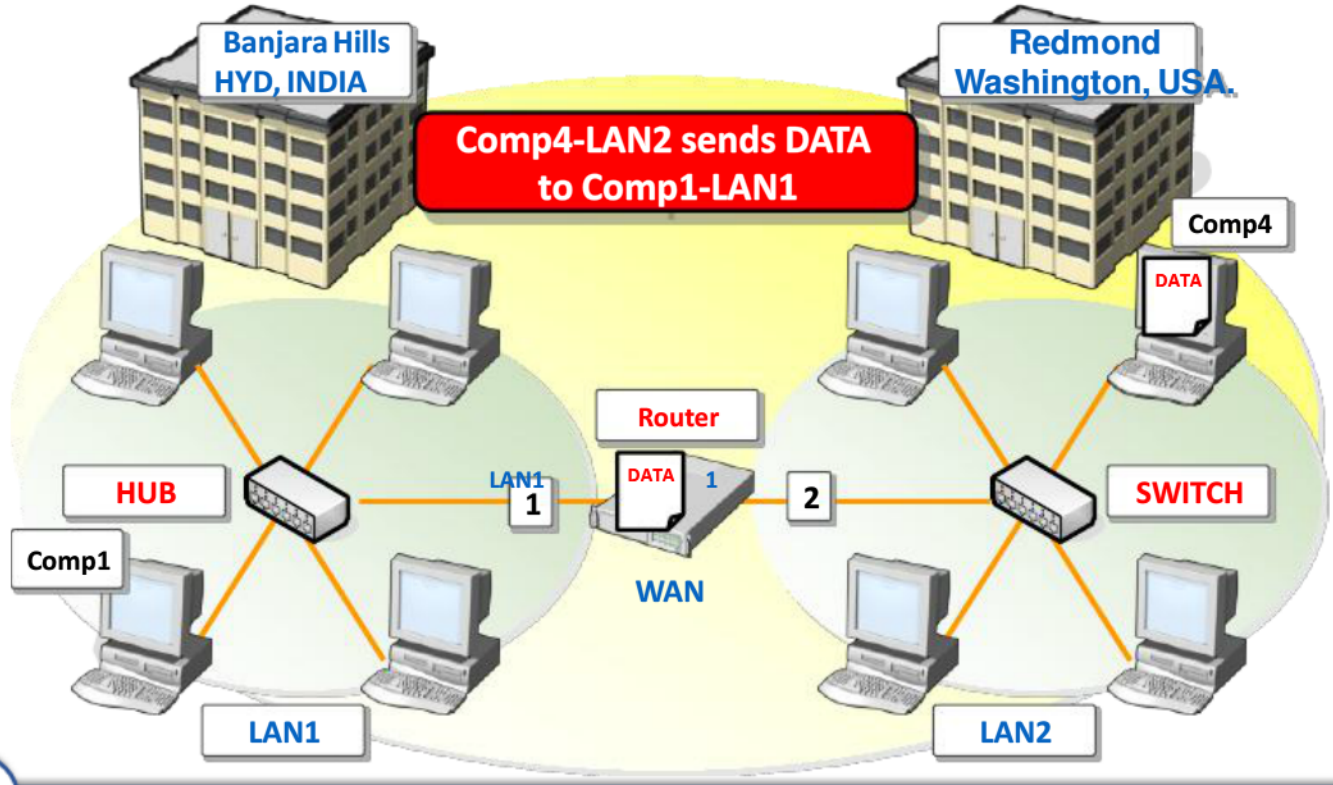
How Switch works ?



How Router works ?



How Router works ?



The History of Microsoft N/W OS

- Windows NT 3.1 released in 1993
- Windows NT 3.5 released in 1994
- Windows NT 4.0 released in 1996
- Windows NT 5.0 was renamed as Windows 2000
- Windows .NET Server was renamed as Windows 2003
- Windows Server 2008
- Windows Server 2012

Operating System

- An operating system is a software program that enables the computer hardware to communicate and operate with the computer software.
- Two types of Operating Systems

  Client OS

  Example-Windows Xp, Vista, Windows 7, Windows 8

  Server OS

  Example-Windows 2003, 2008, 2012

Types of Hardware Servers

Tower Server

Blade Server

Rack Server

Windows 2008 Flavors

Microsoft Windows Server 2008
Standard Edition

Microsoft Windows Server 2008
Enterprise Edition

Microsoft Windows Server 2008
Data Center Edition

Windows 2012 Editions

Microsoft Windows Server 2012
Foundation Edition

Microsoft Windows Server 2012
Essentials Edition

Microsoft Windows Server 2012
Standard Edition

Microsoft Windows Server 2012
Data Center Edition

Windows Server 2012 Editions

- **Foundation Edition:**
  - Available only for OEM
  - License limited to 15 user accounts .
- **Essentials Edition:**
  - License limited to 25 user accounts.
- **Standard Edition:**
  - Full Windows Server functionality with two virtual instances .
- **Data Centre Edition:**
  - Full Windows Server functionality with unlimited virtual instances.

Windows 2012 Requirements

Component	Requirement
Processor	Minimum: **1 processor with 1.4 GHz. {(X64) 64bit processor}** Maximum: **64 processors.** Note: **Hyper –V Compatible Processor is recommended for Standard and Data Center Editions.** **Intel VT or AMD – V.**
Memory	Minimum: **512 MB RAM** Maximum: **4 TB RAM**
Available Disk Space	Minimum: **10 GB** Recommended: **80 GB or greater**
Drive	**DVD-ROM drive**

Features of Windows Server 2012

- 64 Bit operating System
- Easy Installation
- Cloud Infrastructure
- Improved Server Manager
  - — Customized Dash Board.
  - — Remote Management of Server Core and Full.
- Active Directory
  - — Administrative Center and Recycle Bin.
  - — Domain Services.
  - — Federation Services and Lightweight Directory Services.
  - — Certificate Services and Rights Management Services.

Features of Windows Server 2012

- In-built GPMC
- Centralized deployment of applications
- Disk Quotas
- Distributed File System
- Windows Server Backup
- DNS Dependency
- Internet Information services
- Improved Virtualization Features
  - — Live Migrations of Virtual Machines and Storage.
  - — Hyper – V Replica.
  - — Dynamic Memory.

Features of Windows Server 2012

- Enhanced Windows Deployment Services
  - — Deploy OS with or without Active Directory.
- Windows Server Core
  - — Anytime Conversion from Core to Full and Vice – Versa.
- Network Access protection
- Improved DHCP Server
  - — Failover DHCP Server
  - — Split Scope
- Improved Security
  - — Kerberos Version5
  - — Internet Protocol Security.

Zoom Technologies

Server Core

- **Benefits of Server Core**
  - ➢ **Greater stability**
  - ➢ **Simplified management**
  - ➢ **Reduced maintenance**
  - ➢ **Reduced memory and disk requirements**
  - ➢ **Reduced attack surface**

IP Addressing

- **Two Versions of Addressing Scheme**
  - **IP version 4 – 32 bit addressing**
  - **IP version 6 – 128 bit addressing**

IP Address Classes

- **Total IP Addressing Scheme is divided into 5 Classes**
  - **CLASS A**
  - **CLASS B**
  - **CLASS C** — **LAN & WAN**
  - **CLASS D** — **Multicasting**
  - **CLASS E** — **Research & Development**

Class Ranges

- **CLASS A Range**
  - 0.0.0.0 - 127.255.255.255
- **CLASS B Range**
  - 128.0.0.0 - 191.255.255.255
- **CLASS C Range**
  - 192.0.0.0 - 223.255.255.255
- **CLASS D Range**
  - 224.0.0.0 - 239.255.255.255
- **CLASS E Range**
  - 240.0.0.0 - 255.255.255.255

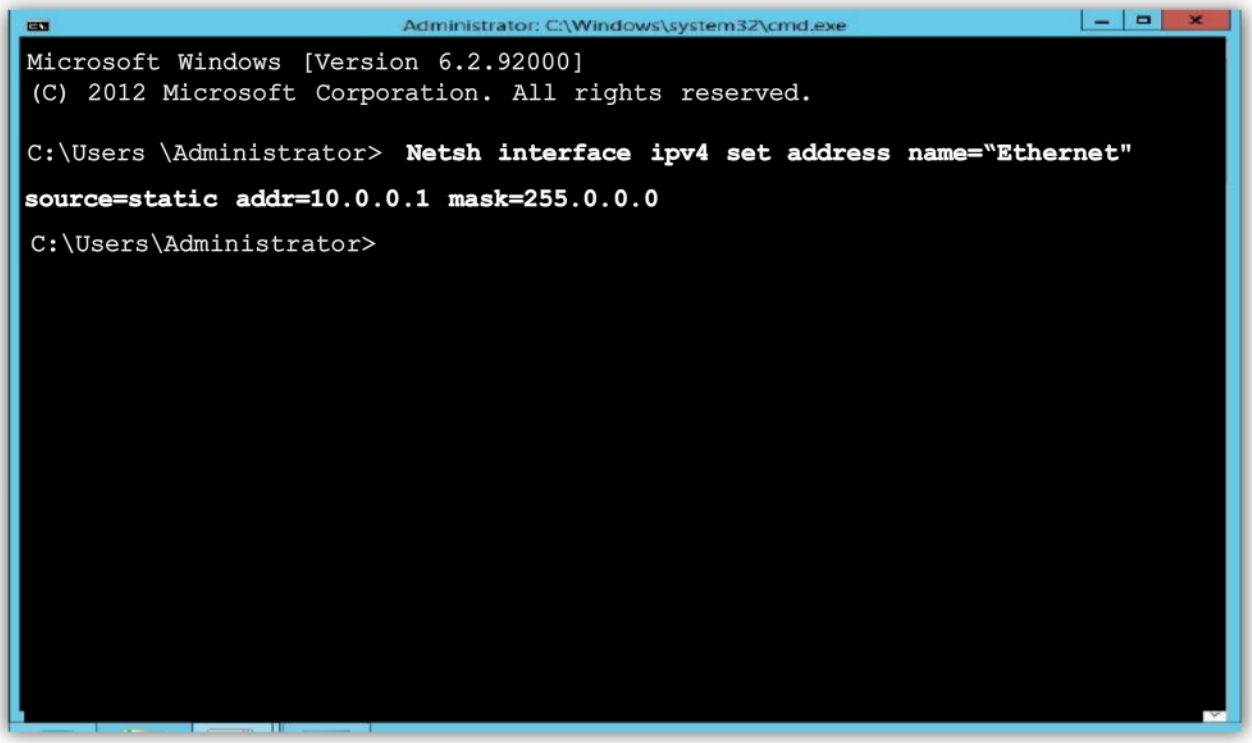
Octet Format

- **IP address is divided into Network & Host Portion**
  - CLASS A is written as N.H.H.H
  - CLASS B is written as N.N.H.H
  - CLASS C is written as N.N.N.H

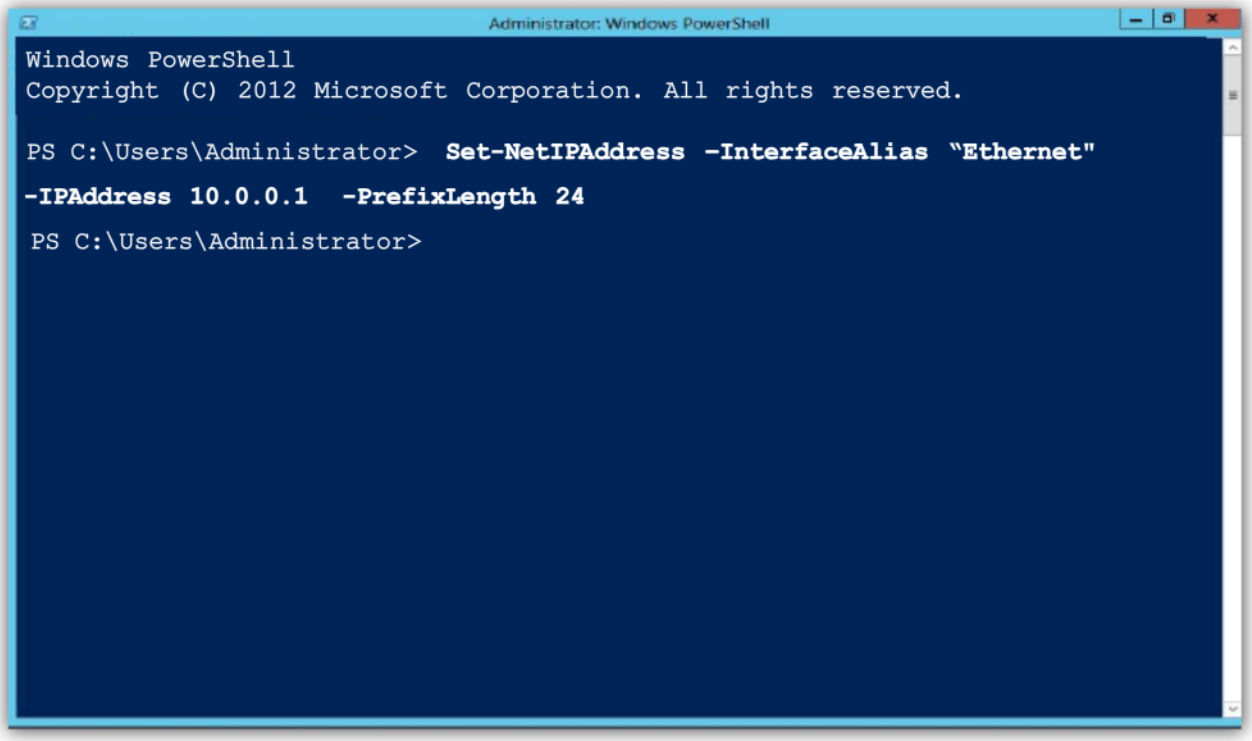
Private and Public IP Address

- **Private IP Address**
  - CLASS A 10.0.0.0 - 10.255.255.255
  - CLASS B 172.16.0.0 - 172.31.255.255
  - CLASS C 192.168.0.0 - 192.168.255.255
- **Public IP Address**
  - Apart from the above specified IP addresses all other IP addresses are Public IP's

Assigning IP address via Command Prompt



Assigning IP address via Powershell



Logical Topologies

- **Workgroup Model or Peer-To-Peer Model**
- **Domain Model or Client/Server Model**

Logical Topologies

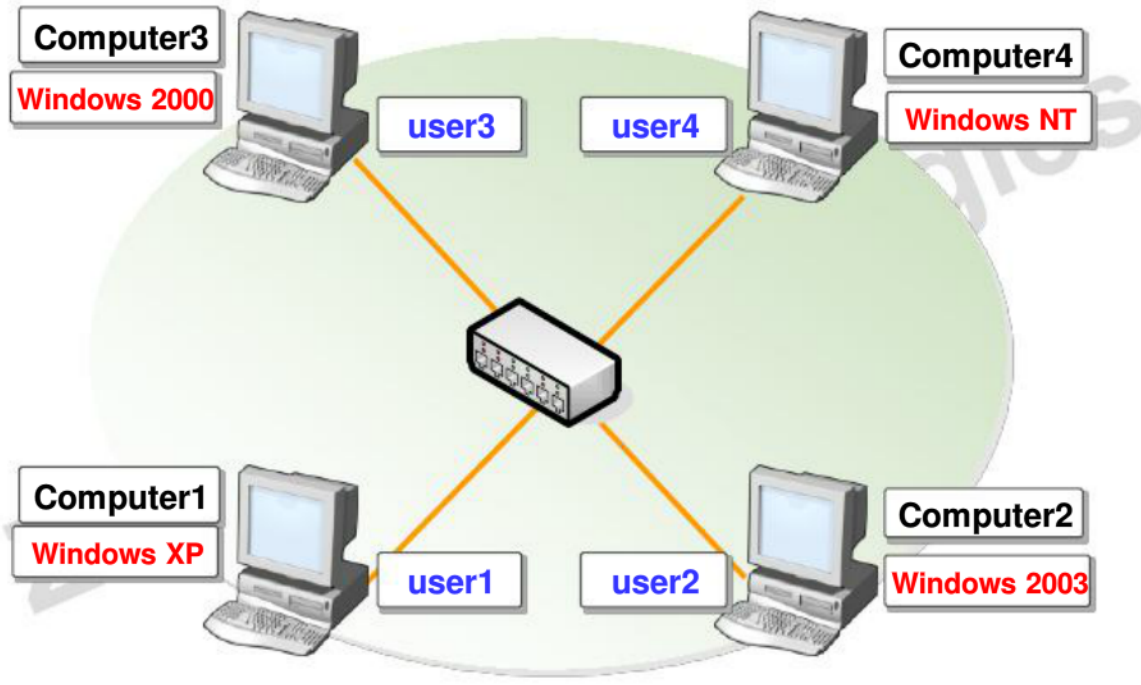
IN A WORKGROUP MODEL

- All computers are peers; no computer has control over another computer.
- Each computer has a set of user accounts. To use any computer in the workgroup, you must have an account on that computer

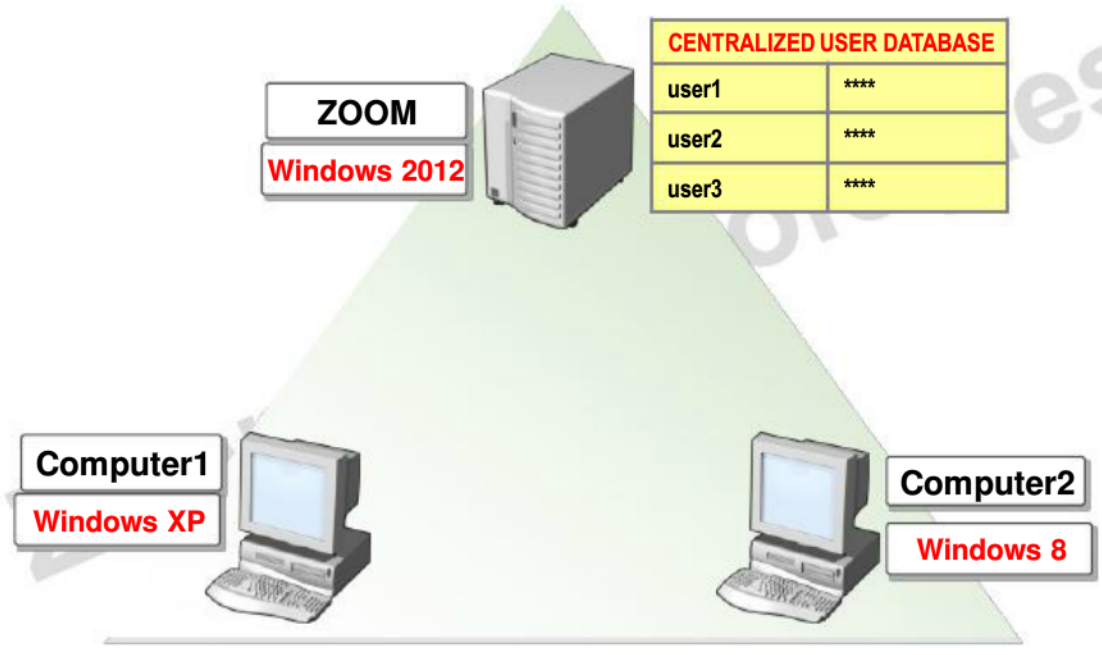
IN A DOMAIN MODEL

- One or more computers are servers. Network administrators use servers to control the security and permissions for all computers on the domain. This makes it easy to make changes because the changes are automatically made to all computers.

Workgroup Model



Domain Model



What Is Active Directory Domain Services ?

- The AD DS database stores information on user identity, computers, groups, services and resources.
- AD DS domain controllers also host the service that authenticates user and computer accounts when they log on to the domain

Purpose of Active Directory

- Provides User Logon and Authentication Services using Kerberos protocol.
- To Centralize and Decentralize the resource management.
- To centrally organize and manage:
  - User Accounts, Computers, Groups, Network Resources.
- Enables authorized Users to easily locate Network Resources.

Domain

- Domain is a logical grouping of user, computer, and group objects for the purpose of management and security.
- Creating the initial domain controller in a network also creates the domain—you cannot have a domain without at least one domain controller.
- Each domain is identified by a DNS domain name.

What is a Domain Controller ?

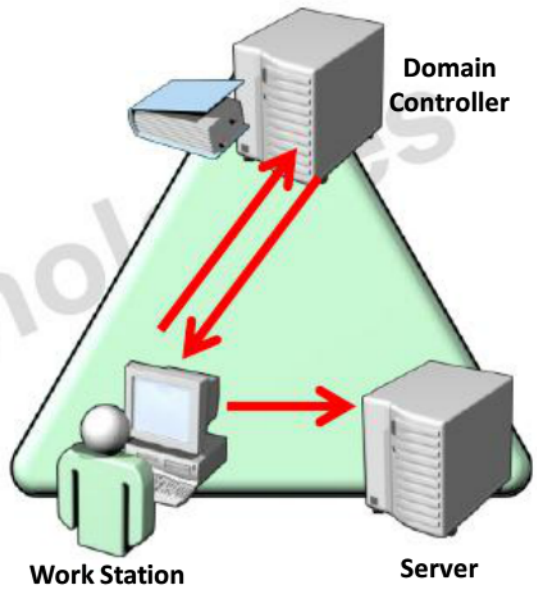
- A domain controller is a server that is configured to store a copy of the AD DS directory database (NTDS.DIT) and a copy of the SYSVOL folder.
- All domain controllers except RODCs store a read/write copy of both NTDS.DIT and the SYSVOL folder.
- NTDS.DIT is the database itself, and the SYSVOL folder contains all the template settings for GPOs.

What is a Domain Controller ?

- Domain controllers host several other Active Directory–related services, including the Kerberos authentication service and the Key Distribution Center (KDC).
- Kerberos authentication service is used by User and Computer accounts for logon authentication
- KDC is the service that issues the ticket-granting ticket (TGT) to an account that logs on to the AD DS domain.

AD DS Logon Process

1. User Account is authenticated to Domain Controller
2. Domain Controller returns TGT back to Client
3. Client uses TGT to apply for access to Workstation
4. Domain Controller grants access to Workstation
5. Client uses TGT to apply for access to Server
6. Domain Controller returns access to Server



Clients & Member Servers

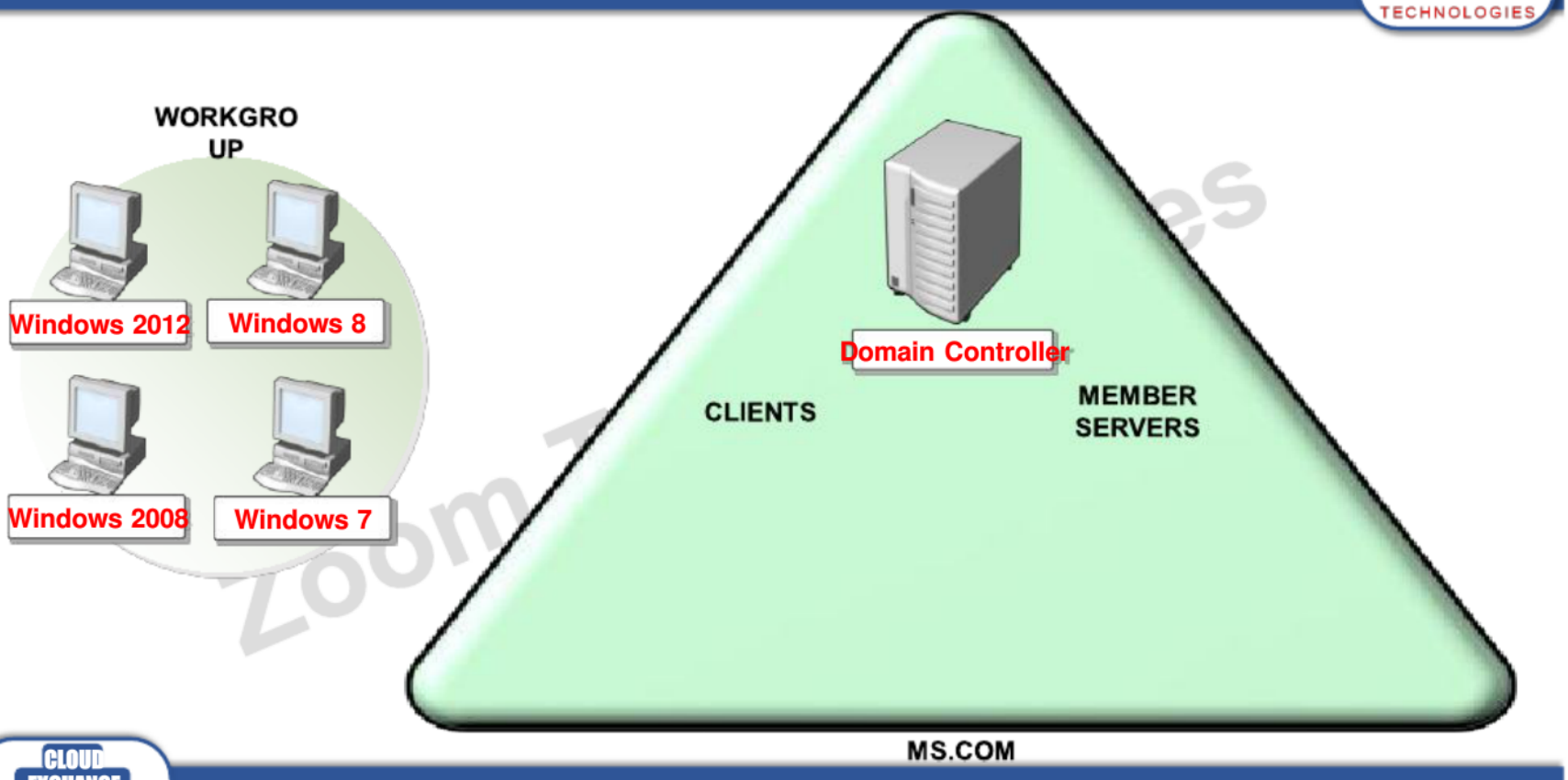
CLIENTS

- A computer joined in the domain with Client Operating system.
- Client Operating systems like
  - Windows 8, Windows 7, Windows XP professional . . .

MEMBER SERVERS

- A computer joined in the domain with Server Operating system.
- Server Operating systems like
  - Windows server 2012, Windows server 2008, Windows server 2003....

Configuring Clients & Member Servers



Local Users & Domain Users

Local User

- A user account created in local database of a computer.
- Local users are generally used in WORKGROUP model.
- Local users can login only on the respective computer.

Domain User

- A user account created in ACTIVE DIRECTORY database.
- Domain users are used in DOMAIN model.
- Domain users can logon to any computer in the DOMAIN.

DS Commands

Command	Description
DSadd	Creates AD DS objects
Dsget	Displays properties of AD DS objects
Dsquery	Searches for AD DS objects.
DSmod	Modifies AD DS objects
DSrm	Removes AD DS objects
Dsmove	Moves AD DS objects

DS Commands - Example

- **To modify the department of a user account, type:**

  Dsmod user "cn=vijay kumar, ou=users, dc=zoom, dc=com" –dept IT
- **To display the email of a user account, type:**

  Dsget user "cn=vijay kumar, ou=users, dc=zoom, dc=com" –email
- **To delete a user account, type:**

  Dsrm "cn=vijay kumar, ou=users, dc=zoom, dc=com"
- **To create a new user account, type:**

  Dsadd user "cn=vijay kumar, ou=users, dc=zoom,dc=com"

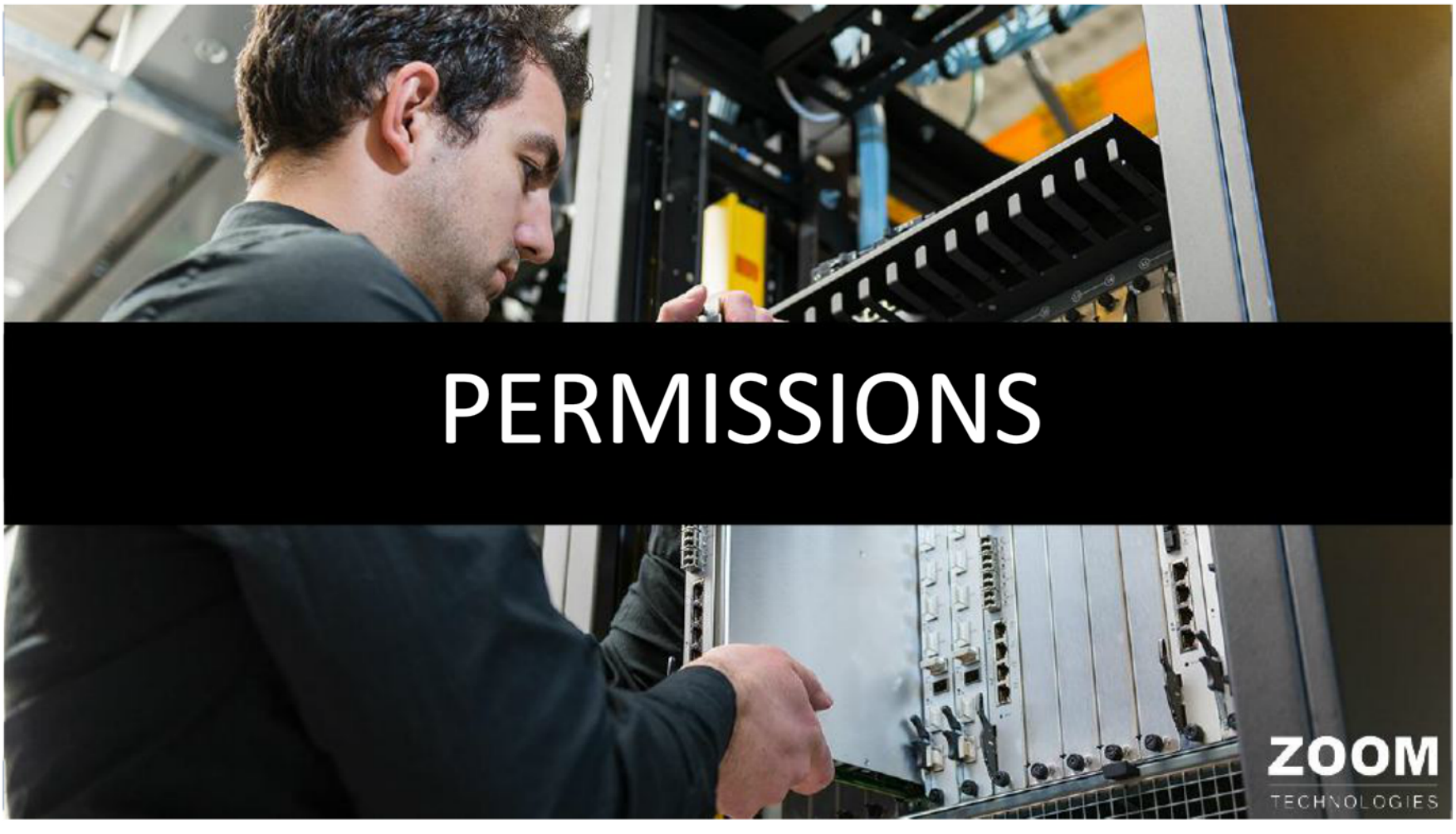
Manage User Accounts via PowerShell

Cmdlet	Description
New-ADUser	Creates user accounts
Set-ADUser	Modifies properties of user accounts
Remove-ADUser	Deletes user accounts
Set-ADAccountPassword	Resets the password of a user account
Set-ADAccountExpiration	Modifies the expiration date of a user account
Unlock-ADAccount	Unlocks a user account after it has become locked after too many incorrect login attempts

Powershell Cmdlets - Example

- **To create a new user account with Department IT, type:**

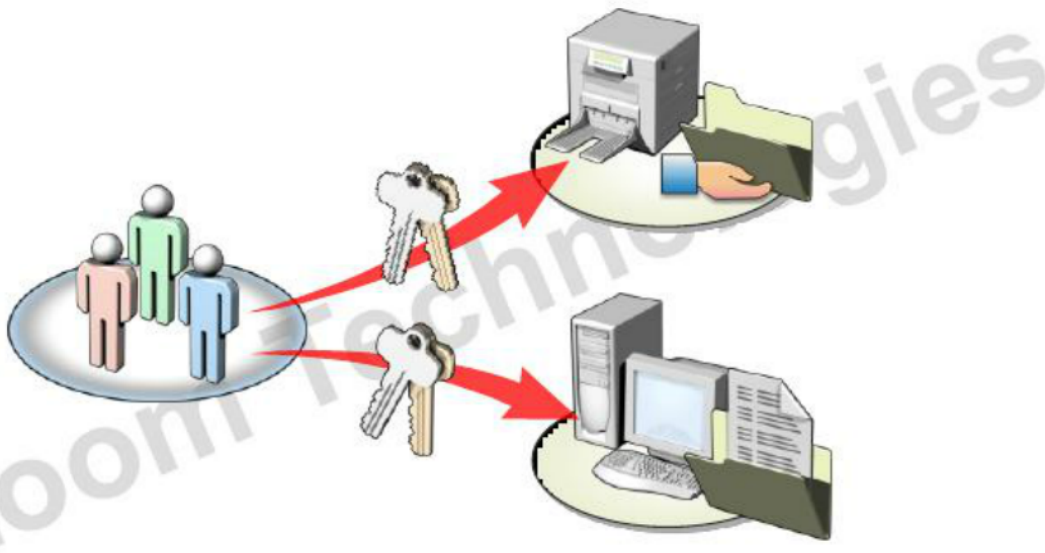
  New-ADUser “Vijay Kumar" –AccountPassword (Read-Host –AsSecureString "Enter password") -Department IT



What are Permissions?

- Permissions define the type of access granted to a user, group, or computer to access resources.
- Permissions can be applied to resources such as files, folders, and printers.
  - Like: Privilege to read a file, delete a file, or to create a new file in folder.

What are Permissions?



Types of Permissions

- Security Level Permissions
- Share Level Permissions

Security Level Permissions

- Can be Implemented Only on NTFS partitions.
- Security or NTFS Permissions can be set on Drives, Folders and Files.
- By default, Security permissions will be inherited from its parent drive or folder.
- File permissions override folder permissions.
- Creators of files and folders are their owners.
- Different Security Permissions are
  - Full Control, Modify, Read & Execute, Write, Read, List Folder Contents.

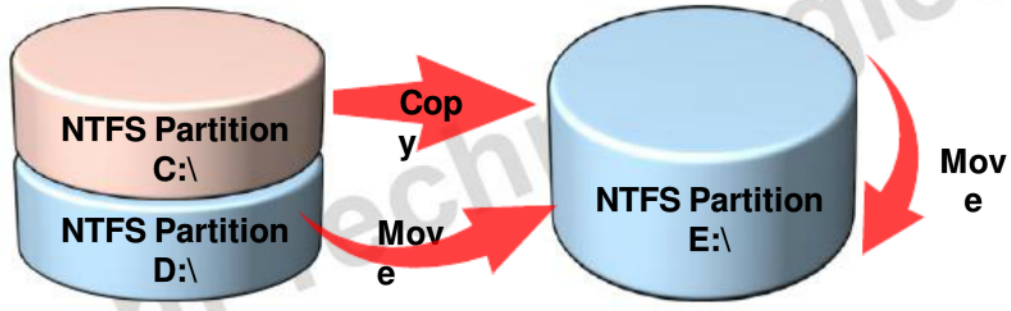
Share Level Permissions

- It can be implemented on NTFS and FAT partitions.
- It can be set on Drives and Shared Folders but not files.
- What are shared folders?
  - Shared folders can be accessed from network.
  - When you copy or move a shared folder, the folder will no longer be shared.
  - To hide a shared folder, include a $ after the name of the shared folder & users access hidden shared folders by typing the UNC path.
- Different Share Permissions are
  - Read, Read/Write.

Effects on NTFS Permissions when Copying or moving files and folders

- When you copy files and folders within the same partition or different partition they inherit the permissions of the destination folder.
- When you move files and folders to a different partition, they inherit the permissions of the destination folder
- When you move files and folders within the same partition, they retain their previous permissions.

Effects on NTFS Permissions when Copying or moving files and folders



Access Based Enumeration (ABE)

- Access Based Enumeration displays only the files and folders that a user has permissions to access.

- If a user does not have read permissions for a folder, windows hides the folder from the users view.

Profiles

- Profile is a User-State Environment.
- Profile contains Personal Settings of the User like
  - Documents
  - Desktop Settings
  - Start Menu Icons
  - Shortcuts
  - Application Data
  - Downloads
  - Pictures, Music, Videos
  - Contacts
  - Favorites, etc

Types of Profiles

- Local Profile
- Roaming Profile

Local Profile

- A local user profile is created the first time you log on to a computer and is stored on a computer's local hard disk.
- Any changes made to your local user profile are specific to the computer on which you made the changes.

Location of Local Profile

- In 2012, 2008, Windows 8, Windows 7, Windows Vista is C:\Users
- In 2003, 2000, NT, XP, 2000 Professional is C:\Documents & Settings.

Roaming Profile

- A roaming user profile is created by your system administrator and is stored on a server.
- This profile is available every time you log on to any computer on the network.
- Changes made to your roaming user profile are updated on the server.

Home Folder

- Home Folder is a centralized location of the users files (data)
- Home Folder make it easier for an administrator to back up user files by collecting all user's files in one location
- Whenever the user logs on to any computer in a domain, Home Folder will be available in the form of Network Drive / Network Location.

What Is FSRM?

- FSRM is intended to act as a capacity management solution for your Windows Server 2012 server.
- It provides a robust set of tools and capabilities that allow you to effectively manage and monitor your server's storage capacity.
- FSRM contains five components that work together to provide a capacity management solution

FSRM Functionality

- Storage quota management
- File screening management
- Storage reports management

What Is Quota Management?

- Quota management is a component that allows you to create, manage, and obtain information about quotas that are used to set storage limits on volumes or folders (and its contents).
- By defining notification thresholds, you can send email notifications, log an event, run a command or script, or generate reports when users approach or exceed a quota.
- Quota management also allows you to create and manage quota templates to simplify the quota management process.

Quota Management

- Quota management is used to limit disk space usage and provides notifications when thresholds are reached.
- Quota notifications can do any of the following:
  - Send email notifications
  - Log an event in Event Viewer
  - Run a command or script
  - Generate storage reports

File Screening Management

- File screen management provides a method for controlling the types of files that can be saved on file servers.
- When users attempt to save unauthorized files, file screening can block the process and notify the administrators to allow for proactive management.

Storage Reports

- Storage reports management is a component that allows you to schedule and configure storage reports about file usage on a file server.
- These reports provide information regarding following :
  - Quota usage.
  - File screening activity.
  - Files that may negatively affect capacity management, such as large files, duplicate files, or unused files.
  - List and filter files according to owner, file group, or a specific file property

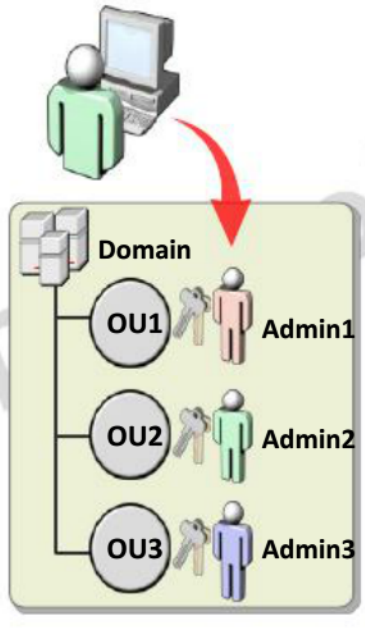
Organizational Unit

- It is a logical container which contain active directory objects (Users, Groups, OU & other objects)
- It is also called as SUBTREE
- It is used for Minimizing administrative tasks
- It is used for organizing and managing the active directory objects
- It is used for delegating the control to one or more users.

What Is Delegation of Control ?

- The process of decentralizing management of organizational units.
- Assigning management of an organizational unit to another user or group
- Eases administration by distributing routine administrative tasks to another user or group.

What Is Delegation of Control ?

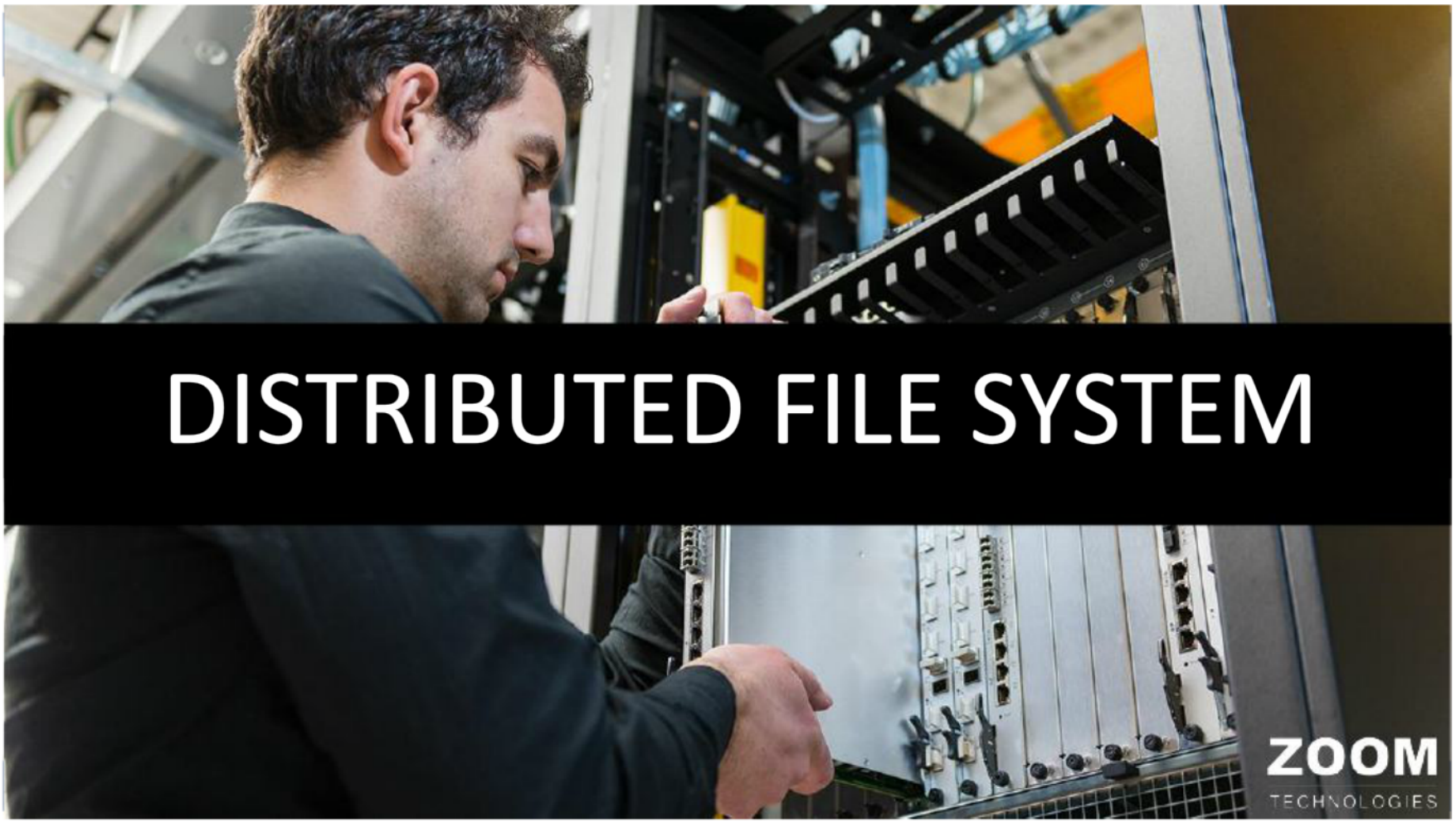


Groups

- It is an object of Active Directory used for applying Permissions and Distribution of emails to its members.

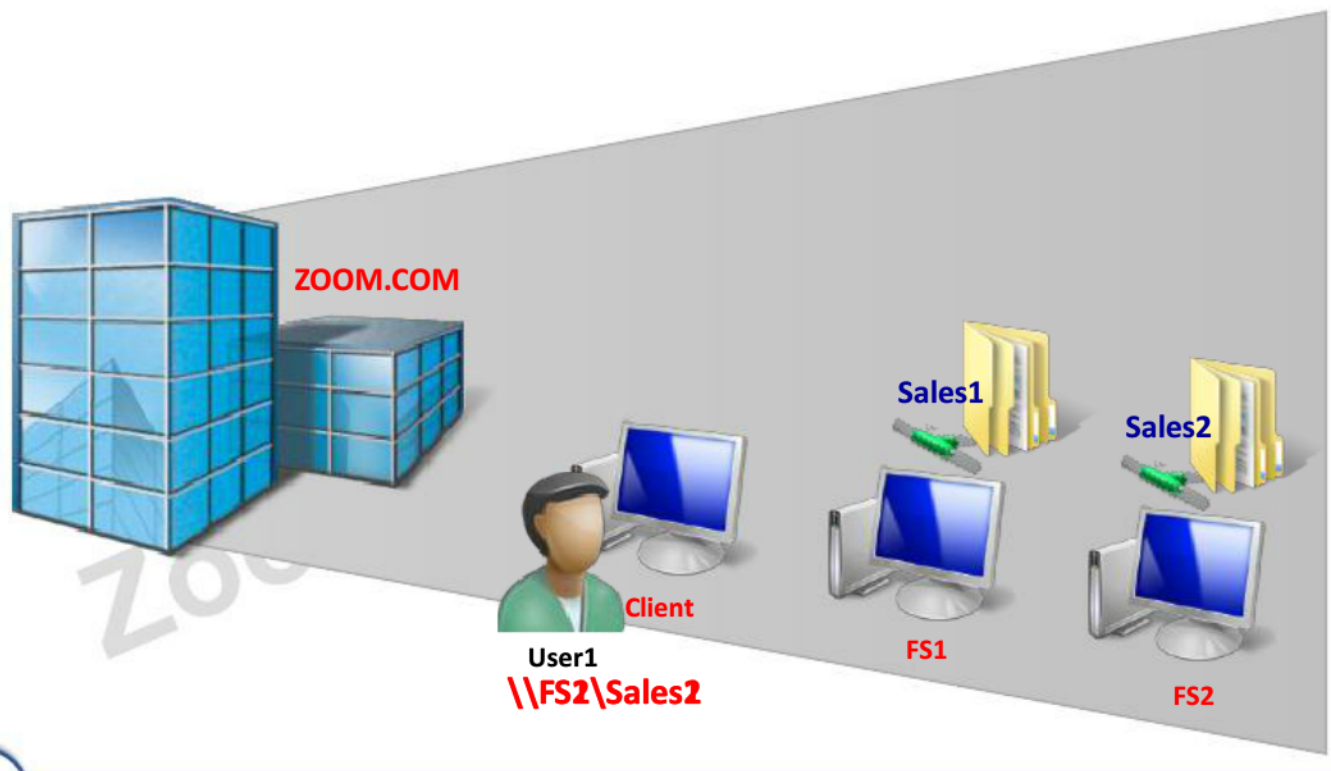
Two types of Groups

- Security Group
- Distribution Group



How Users access Shared Folders ?

ZOOM TECHNOLOGIES

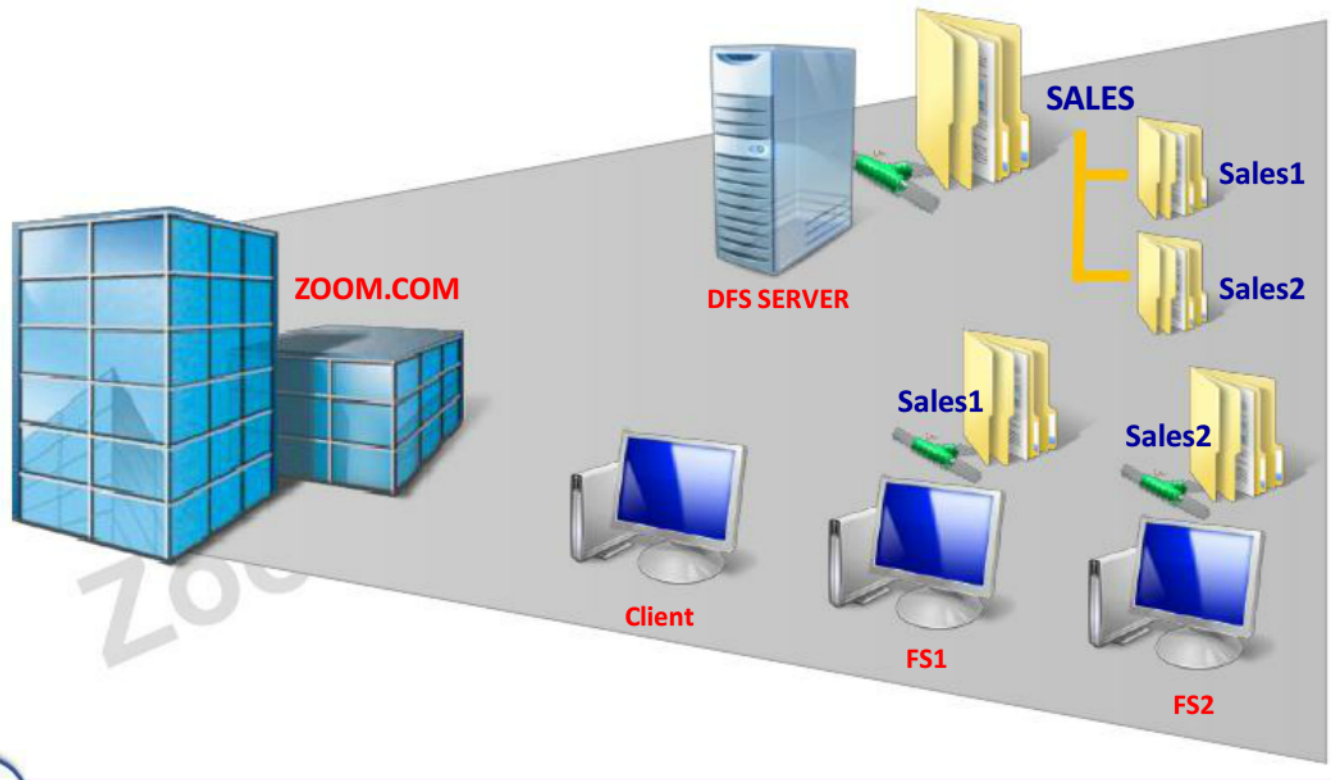


CLOUD EXCHANGE MCSE

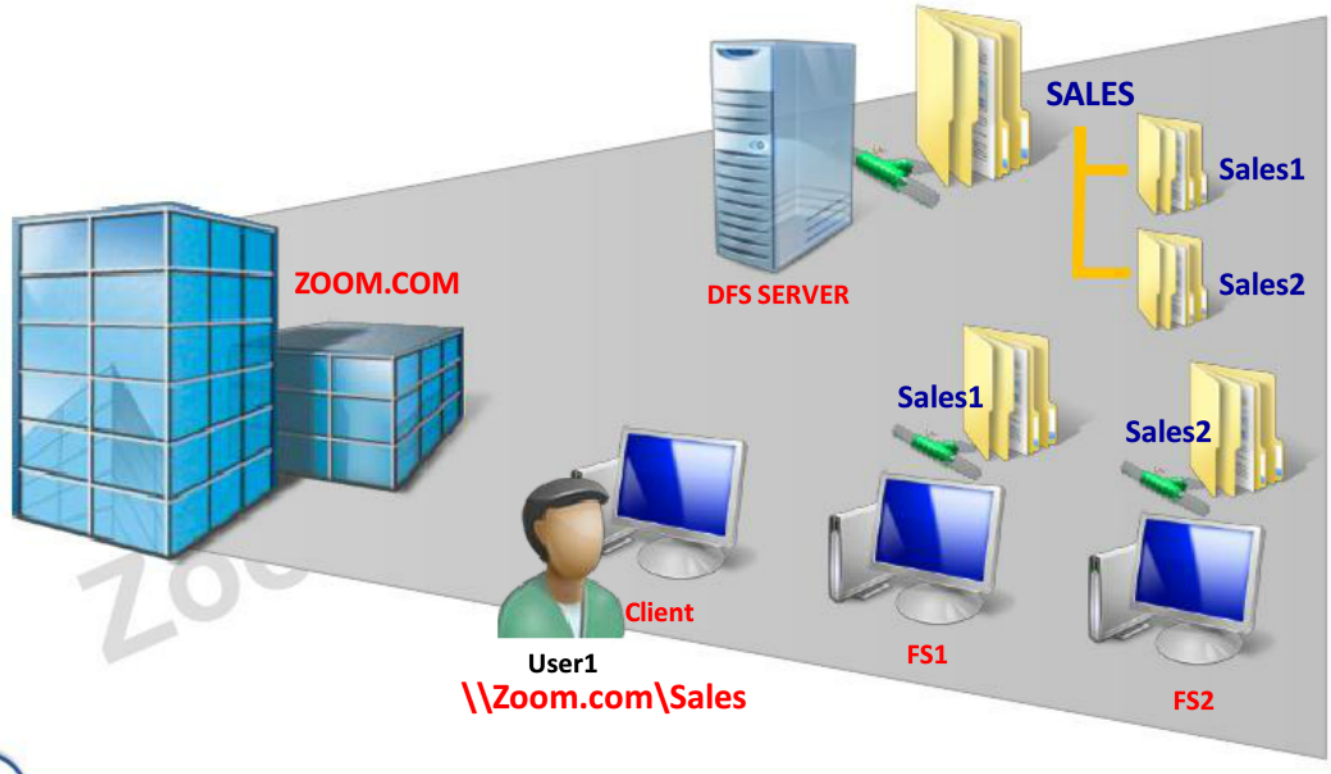
DFS

- DFS incorporates technologies that provide fault-tolerant access to geographically dispersed files.
- DFS namespaces enable a virtual representation of shared folder structures.

How DFS works?



How DFS works?



DFS Namespace (DFS-N)

- Allows administrators to group shared folders that are located on different servers into one or more logically structured namespaces.
- Each namespace appears to users as a single shared folder with a series of subfolders. The subfolders typically point to shared folders that are located on various servers in multiple geographical sites throughout the organization.

DFS - R

- A multimaster replication engine that synchronizes files between servers for local and WAN network connections.
- DFS Replication supports replication scheduling, bandwidth throttling, and uses remote differential compression (RDC) to update only the portions of files that have changed since the last replication.
- You can use DFS Replication in conjunction with DFS namespaces or as a standalone file replication mechanism.

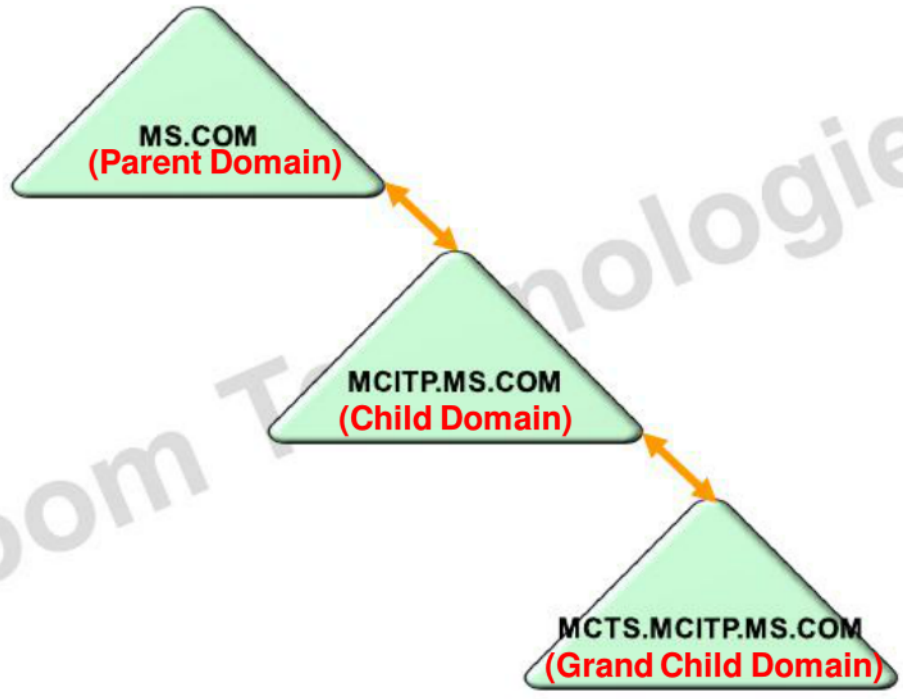
Additional Domain Controllers

- If you already have one domain controller in a domain, you can add additional domain controllers to the domain to improve the availability and reliability of network services.
- Adding additional domain controllers can help provide fault tolerance, balance the load of existing domain controllers, and provide additional infrastructure support to sites.
- The replication type between two read/write dc's is multi master replication.

Tree

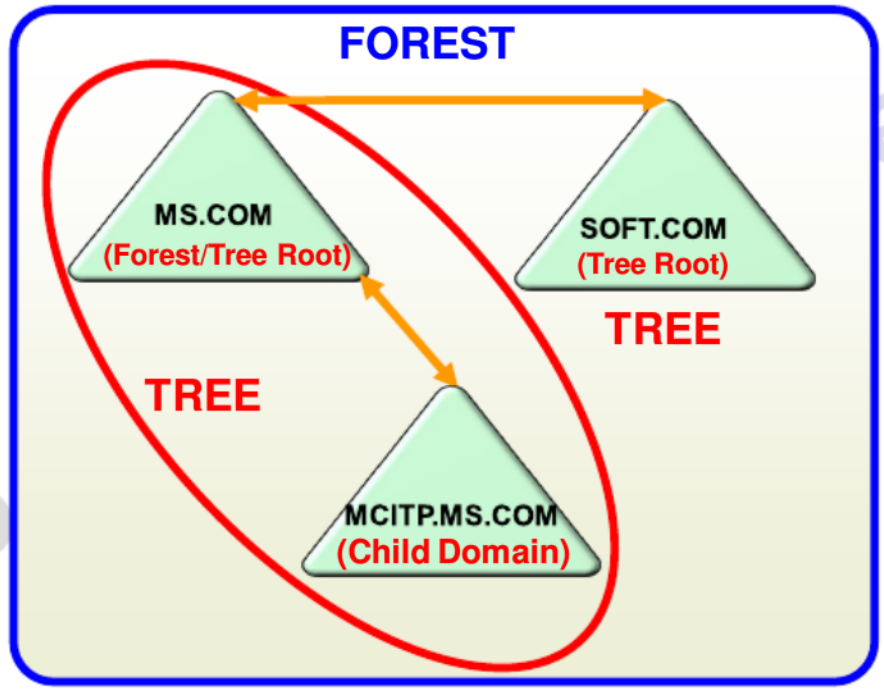
- Tree is a set of one or more domains with contiguous names.
- If more than one domain exists, you can combine the multiple domains into hierarchical tree structures.
- The first domain created is the root domain of the first tree.
- Other domains in the same domain tree are child domains.
- A domain immediately above another domain in the same domain tree is its parent.

Tree



Forest

- Multiple domain trees within a single forest do not form a contiguous namespace.
- Although trees in a forest do not share a namespace, a forest will have a single root domain, called the forest root domain.
- The forest root domain is the first domain created in the forest.
- These two forest-wide predefined groups reside in forest root domain.
  - Enterprise Admins
  - Schema Admins


FOREST
MS.COM
(Forest/Tree Root)
SOFT.COM
(Tree Root)
TREE
TREE
MCITP.MS.COM
(Child Domain)


ACTIVE DIRECTORY
ZOOM
TECHNOLOGIES

Roles of Active Directory

OPERATION MASTERS

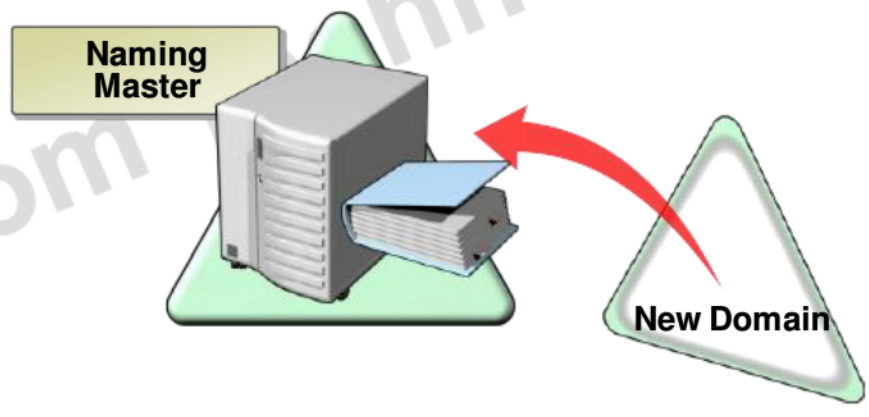
- Naming Master
- Schema Master
- RID Master
- PDC Emulator
- Infrastructure Master
- Global Catalog

Flexible Single Master Operation Roles (FSMO Roles)

Multi Master Operations Role

Naming Master

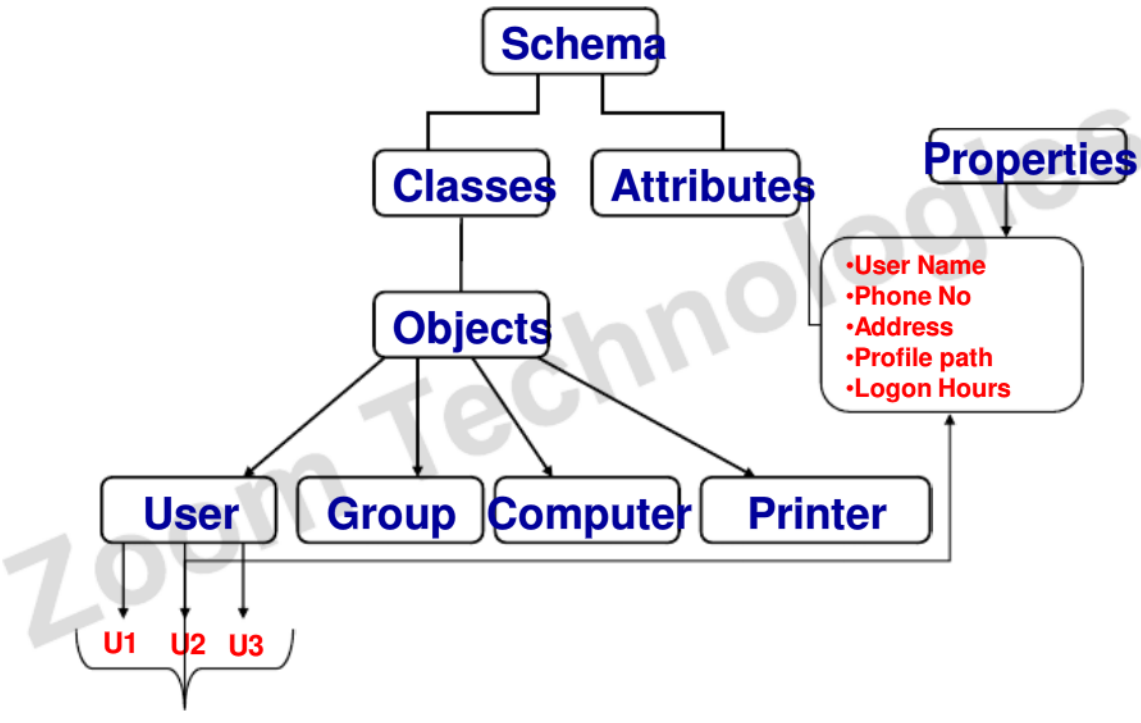
- Checks and Maintains the Uniqueness of the Domain Names in the Whole Forest.
- It is Responsible for Adding, Removing and Renaming the domain names in the whole Forest.



Schema Master

- Schema is a Set of Rules which is used to define the Structure of AD
- Schema contains Definitions of all the Objects which are stored in AD.
- Schema is further classified into:
  - Classes
    - Class is a Template which is used to Create an Object
  - Attributes
    - Attributes are Properties of an Object

Schema Master



Zoom Technologies

Schema Master

- The Schema Master role owner is the DC responsible for performing updates to the directory schema.
- This DC is the only one that can process updates to the directory schema. Once the schema update is complete, it is replicated from the Schema Master FSMO role owner to all other DCs in the directory.
- There is only one Schema Master per forest.

Roles of Active Directory

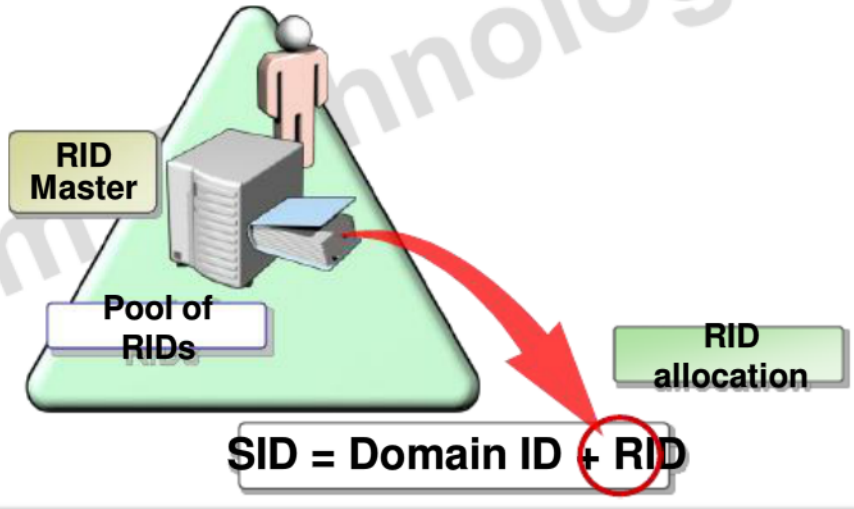
OPERATION MASTERS

- Naming Master
- Schema Master

} Forest Wide Roles

RID Master

- It assigns unique IDs (RIDs) to the objects which are created in the domain
- Allocates pool of Relative IDs (RIDs) to all Domain controllers within a Domain.



PDC Emulator

- Acts as a PDC for Windows NT 4.0 BDC's in the domain
- Processes all password updates for clients
- Receives immediate updates from other domain controllers when a user's password is changed
- It Synchronizes time between the Domain controllers with in the domain.

Infrastructure Master

- **Infrastructure Master Maintains and Updates the Universal Group Membership information**
- **It is Used for Inter-Domain Operations**

Roles of Active Directory

OPERATION MASTERS

- **Naming Master**
- **Schema Master**

} **Forest Wide Roles**

- **RID Master**
- **PDC Emulator**
- **Infrastructure Master**

} **Domain Wide Roles**

Group Policy

- Group policy is a collection of settings which can be applied on computers and users.
- With group policy administrator can centrally manage the computers and users.
- Eases administration using group policy.

Desktop Settings

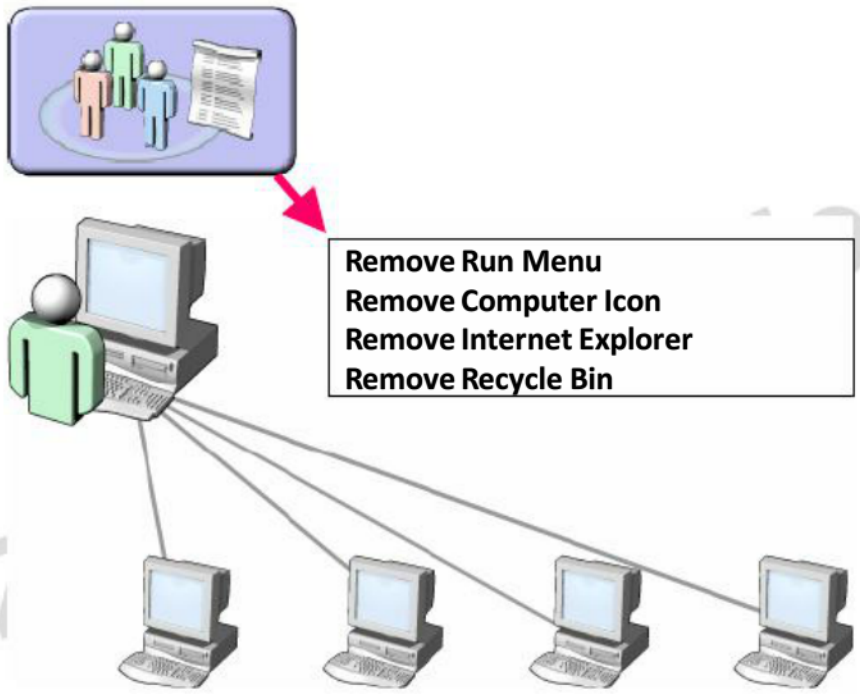
- Computer Icon
- Recycle Bin Icon
- Internet Explorer

Start Menu Settings

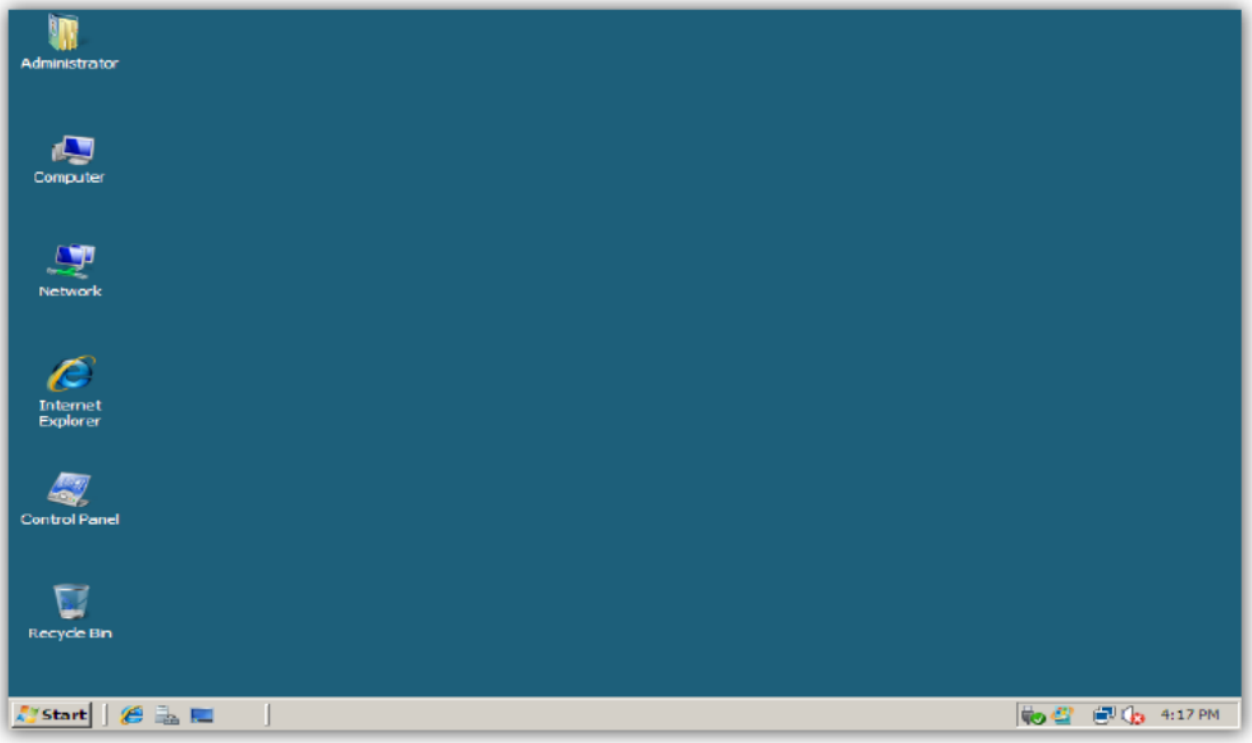
- Help
- Search
- Run Menu

Allow or Deny

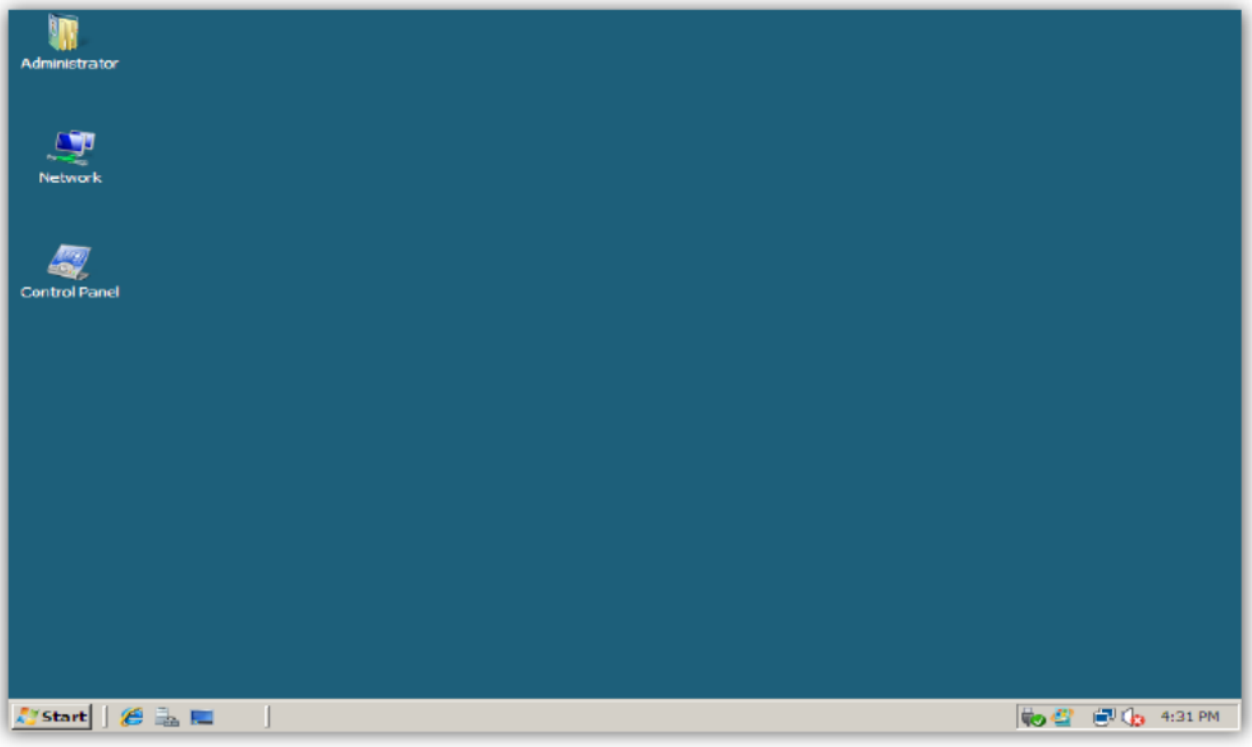
Hide or Show



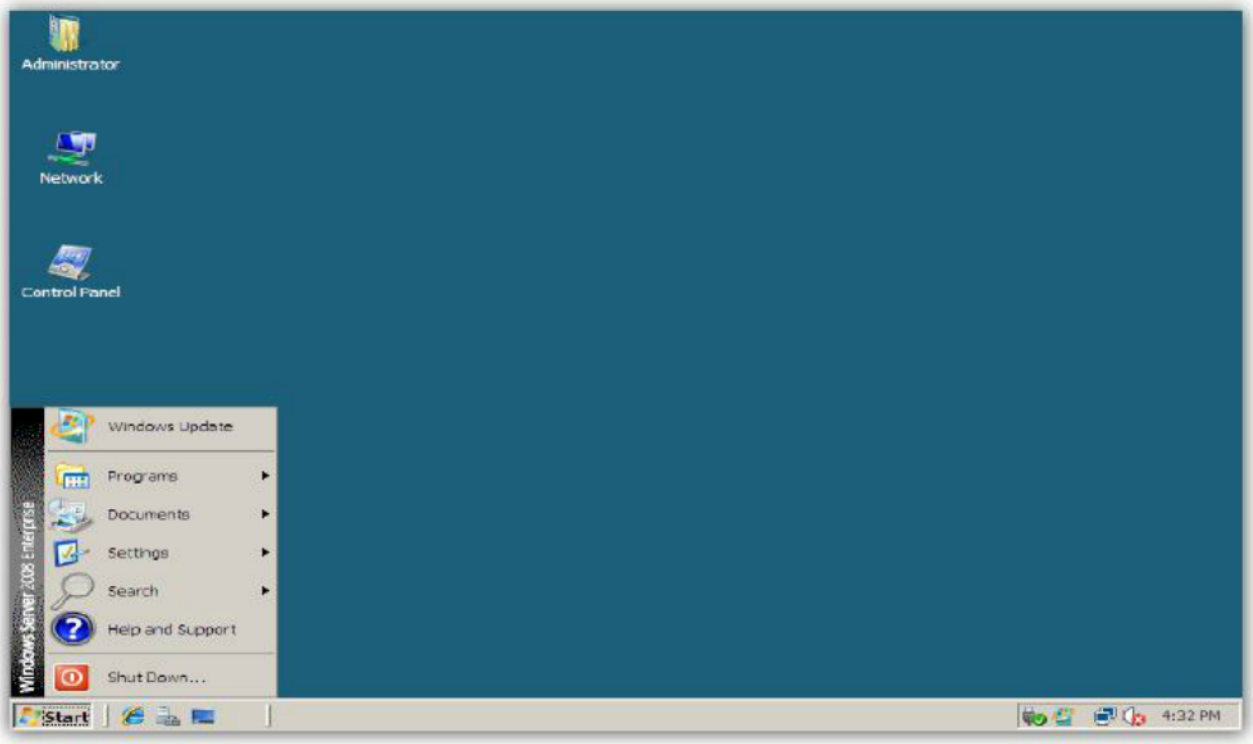
Before Group Policy



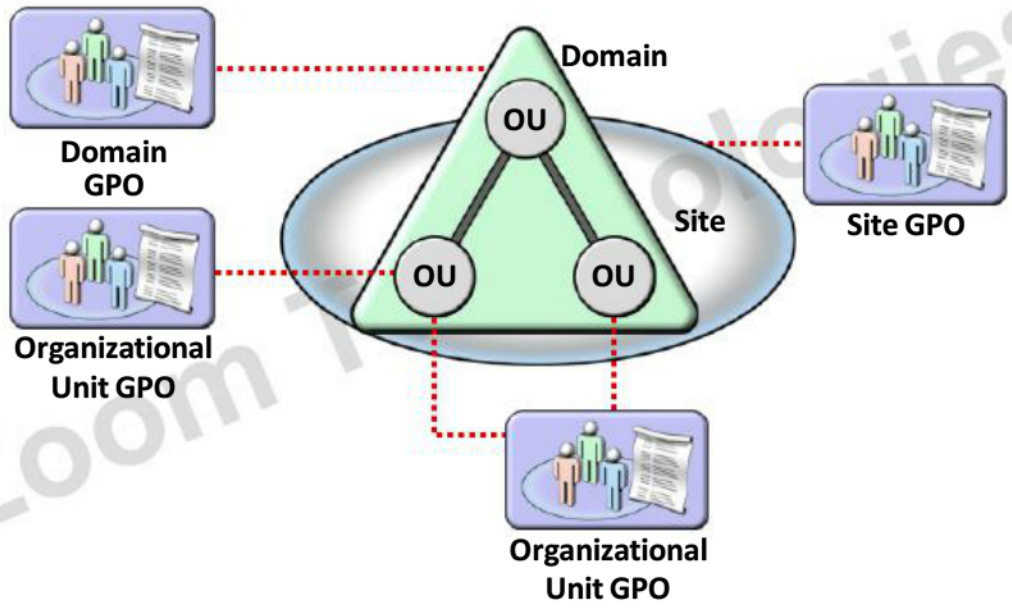
After Group Policy



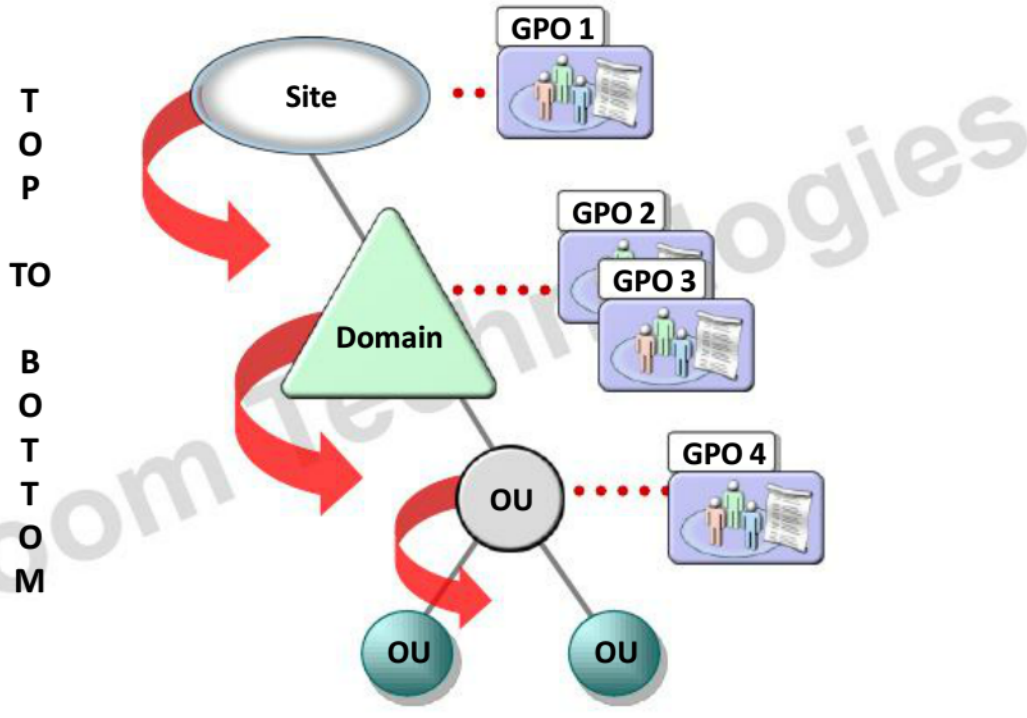
After Group Policy



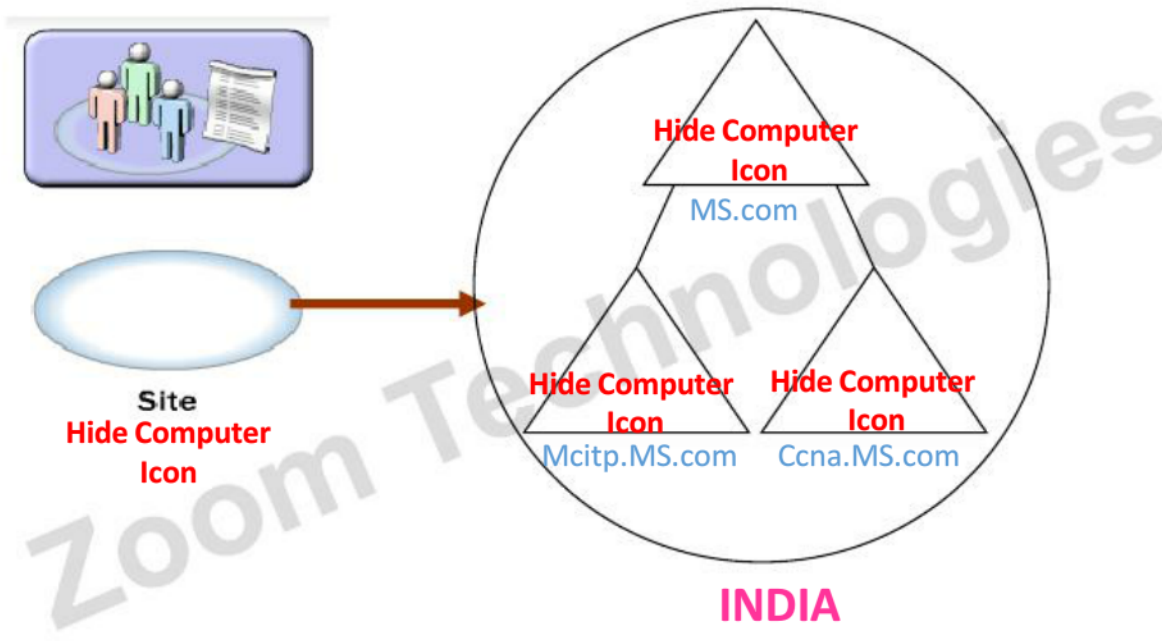
Scopes of Group Policy



Hierarchy of Group Policy

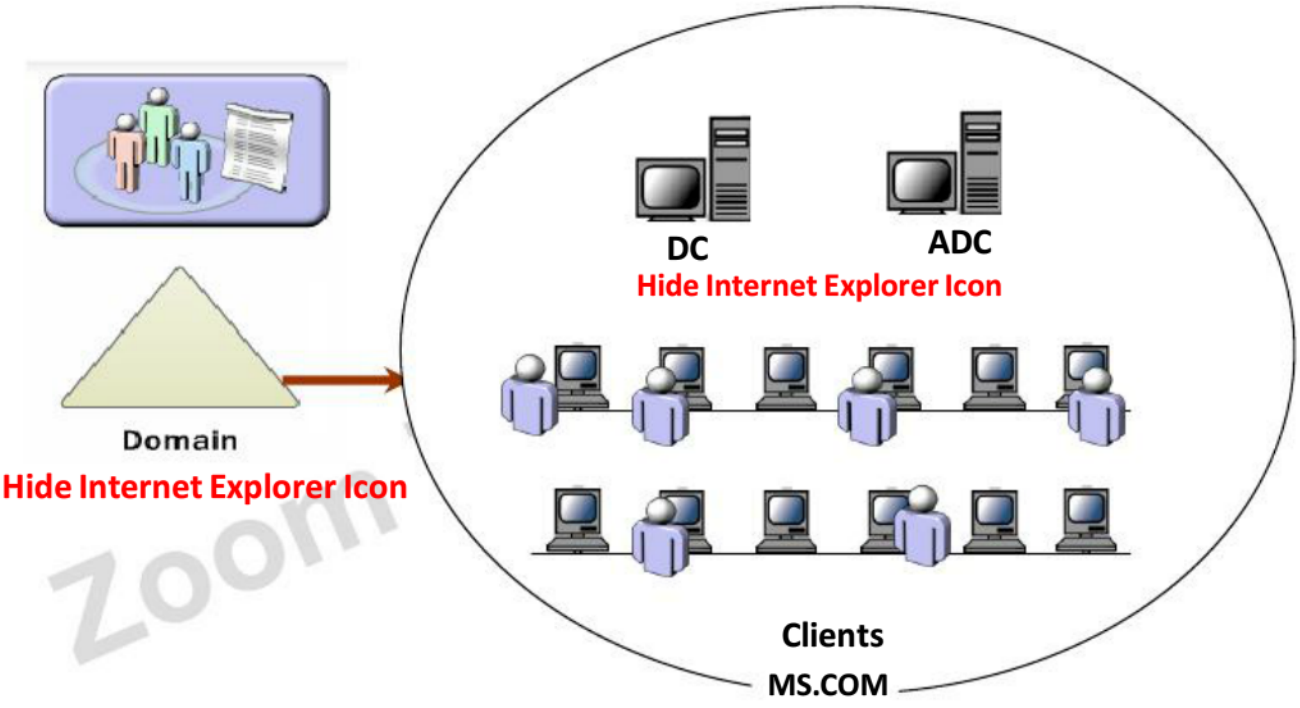


Site Group Policy



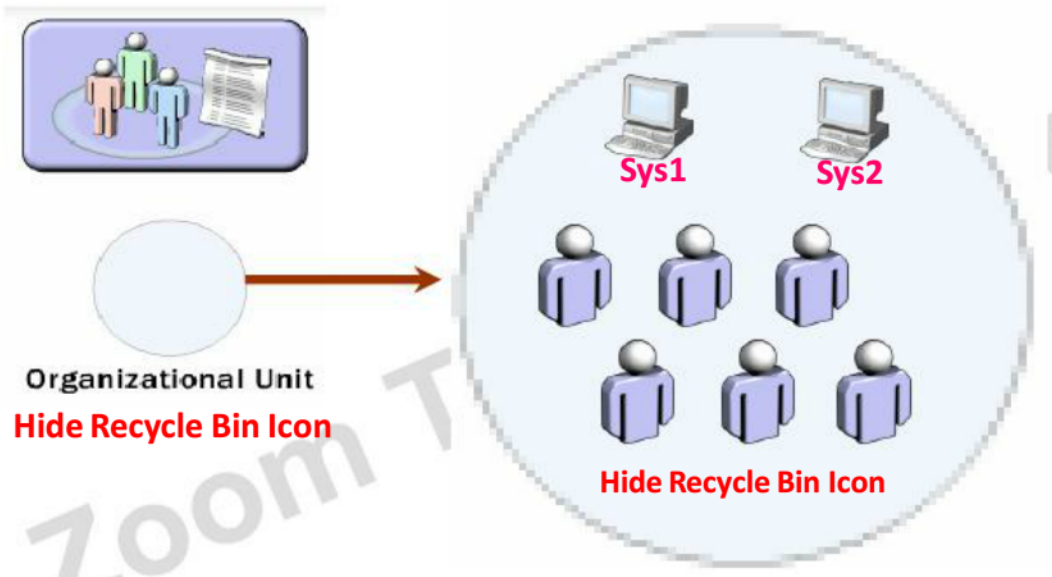
Site Group Policy

Domain Group Policy



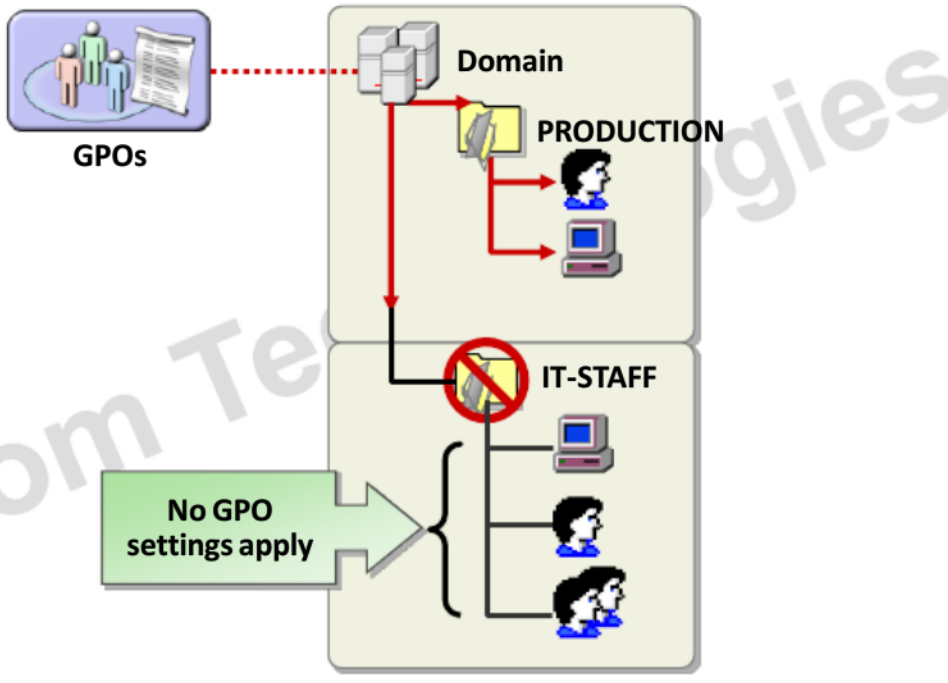
Domain Group Policy

OU Group Policy



OU Group Policy

Blocking the Inheritance of a GPO



Software Deployment

- It is to deploy software (Applications) on all the computers in the domain from one central location by applying the Group Policies.
- Supports the deployment of ".MSI" but not ".EXE" applications.

Folder Redirection

- Redirection of folders on the local computer or on a Shared folder.
- Folders on a server appear as if they are located on the local drive.
- Fastens the User logon process in case if the profile is large.

Auditing

- Audit policy configures a system to audit categories of activities. If audit policy is not enabled, a server will not audit those activities
- Audit events categories are as below :
  - Access to NTFS files and folders
  - Account or object changes in AD DS
  - Logon
  - Assignment of use of user rights

Group Policy preferences

- Group Policy preferences provide better targeting, through item-level targeting and action modes.
- Additionally, rich user interfaces and standards-based XML configurations provide you with more power and flexibility over managed computers when you administer GPOs.

- Examples of the new Group Policy preference extensions include folder options, mapped drives, printers, scheduled tasks, services, and Start menu settings.

Trust Relationships

- Secure communication paths that allow objects in one domain to be authenticated and accepted in other domains
- Some trusts are automatically created.
  - Parent-child domains trust each other
  - Tree root domains trust forest root domain
- Other trusts are manually created
- Forest-to-Forest transitive trust relationships can be created in Windows Server 2003, 2008 and Windows server 2012 forests only.

Trust Relationships

Trust categories	• Transitive trusts • Nontransitive trusts
Trust directions	• One-way incoming trust • One-way outgoing trust • Two-way trust
Trust types	• Five types of trusts: Default, Shortcut, External, Forest and Realm

Types of Trusts

DEFAULT : Two-way- transitive Kerberos trusts (Intraforest)

SHORTCUT : One or two-way transitive Kerberos trusts (Intraforest) Reduce authentication requests

EXTERNAL : One way non-transitive NTLM trusts. Used to connect to/from Windows NT or external 2000 domains Manually created

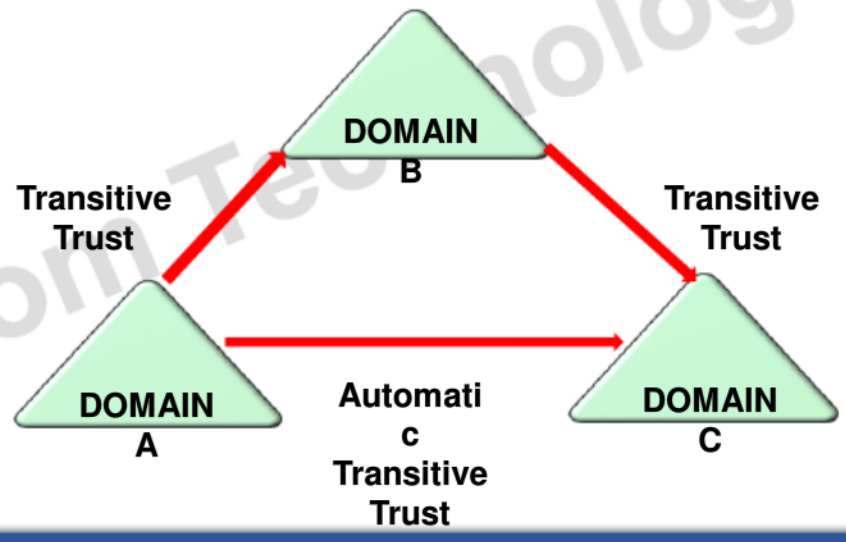
FOREST : One or two-way transitive Kerberos trusts. Only between 2003,2008 or 2012 Forest Roots, Creates transitive domain relationship

REALM : One or two-way – non-transitive Kerberos trusts Connect to/from UNIX Kerberos realms

Transitive Trust

In this category,

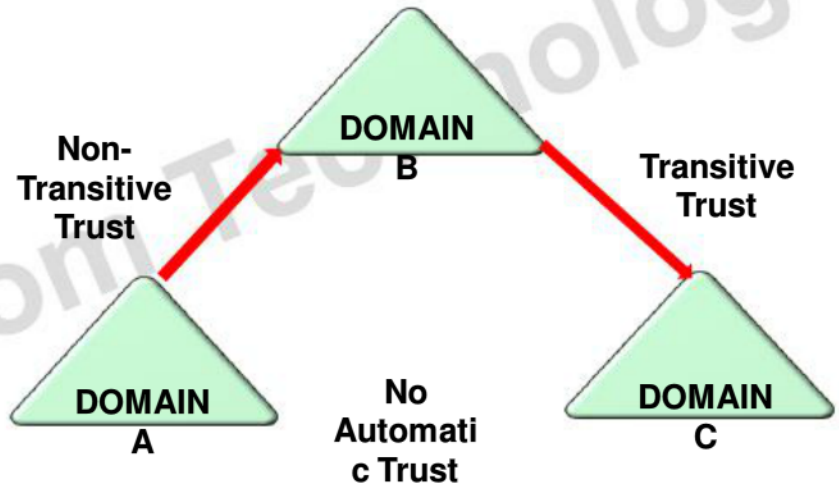
If Domain A trust Domain B and Domain B trust Domain C then Domain A automatically trust Domain C



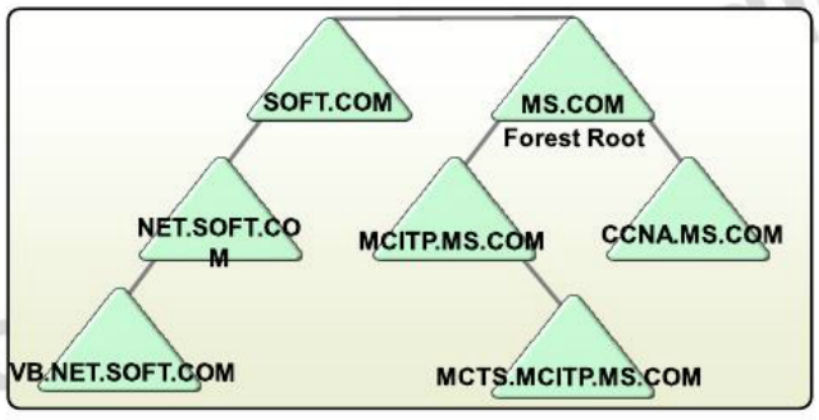
Non-Transitive Trust

In this category,

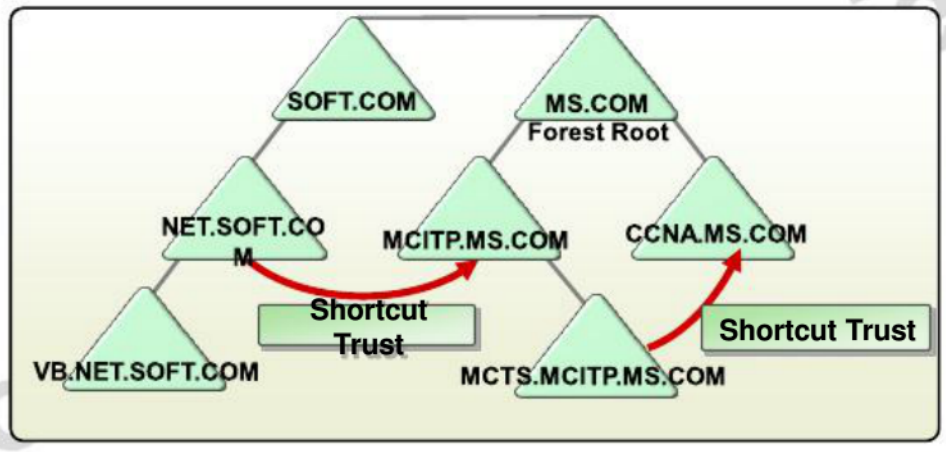
If Domain A trust Domain B and Domain B trust Domain C then Domain A does not trust Domain C



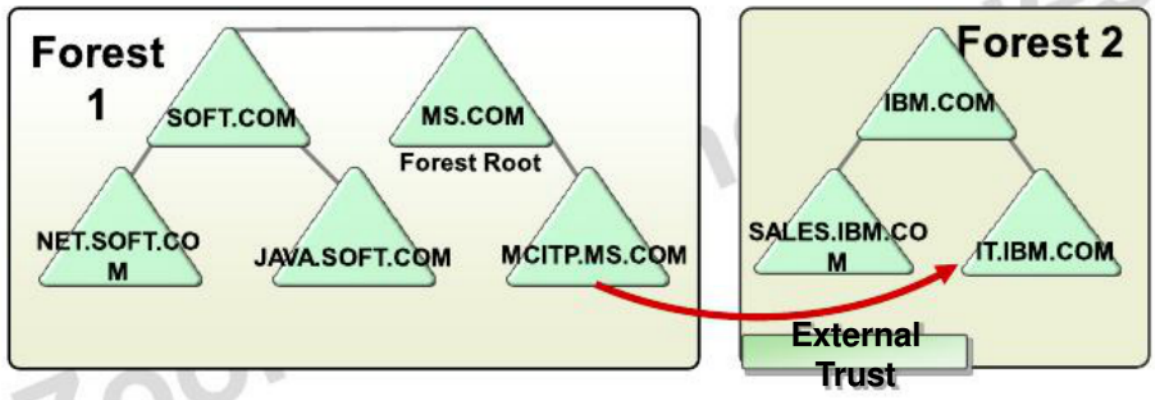
Default



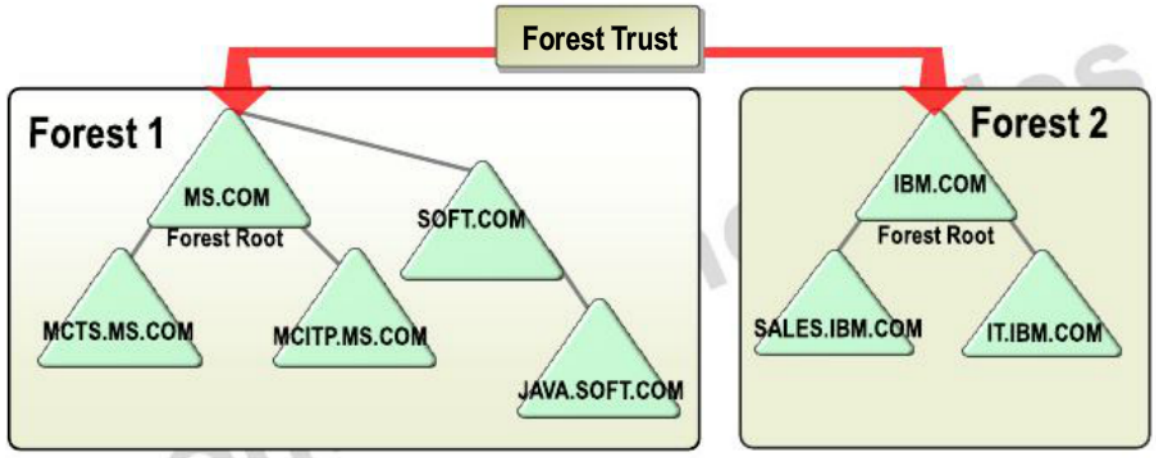
Shortcut



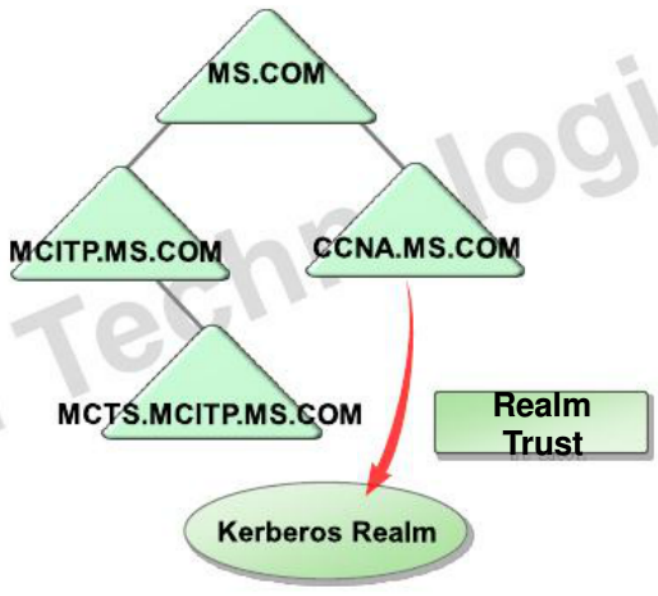
External



FOREST



Realm



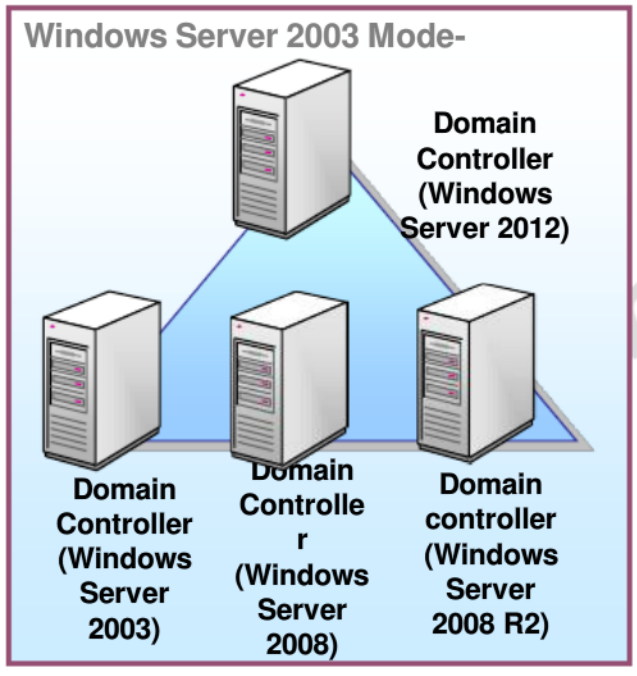
Functional Levels

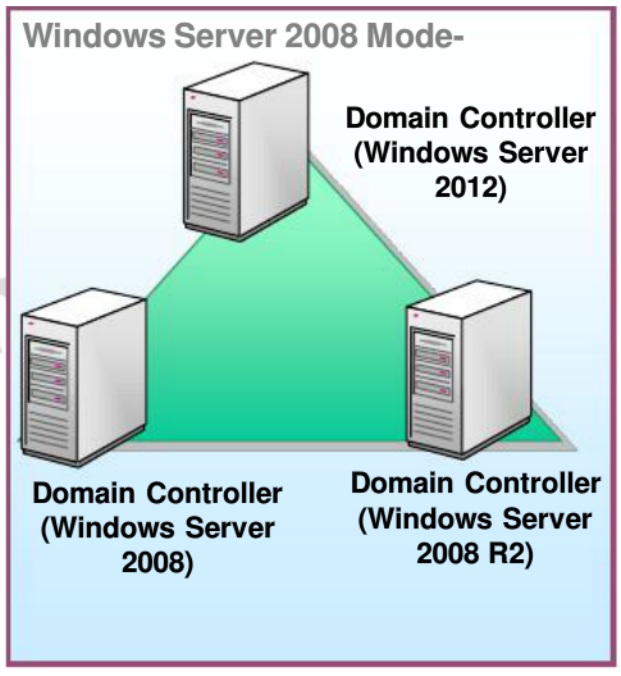
- **Functional levels determine**
  - **Supported domain controller operating system**
  - **Active Directory features will be available**

Domain Functional Levels

Domain Functional Levels	Operating systems Supported on Domain controllers
Windows Server 2003	Windows Server 2003 OS, Windows Server 2008 OS, Windows Server 2008 R2 OS, Windows Server 2012 OS
Windows Server 2008	Windows Server 2008 OS, Windows Server 2008 R2 OS, Windows Server 2012 OS
Windows Server 2008 R2	Windows Server 2008 R2 OS, Windows Server 2012 OS
Windows Server 2012	Only Windows Server 2012 OS

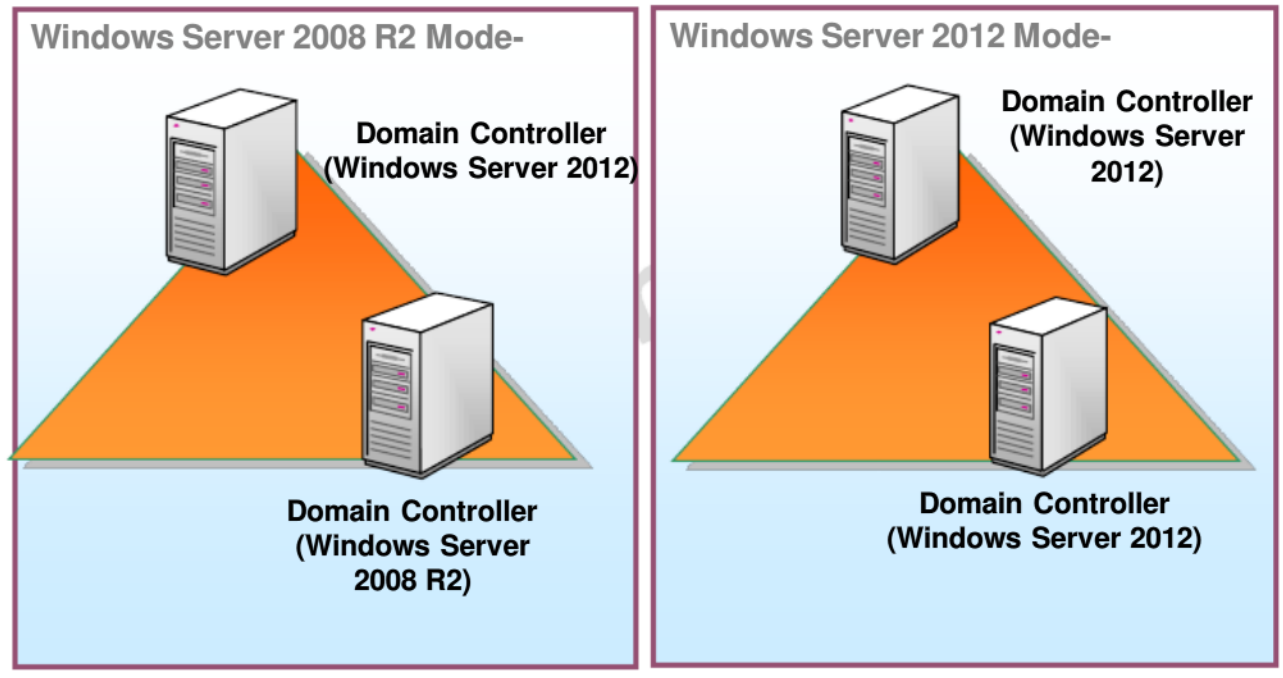
Domain Functional Levels





CLOUD EXCHANGE MCSE

Domain Functional Levels



Forest Functional Levels

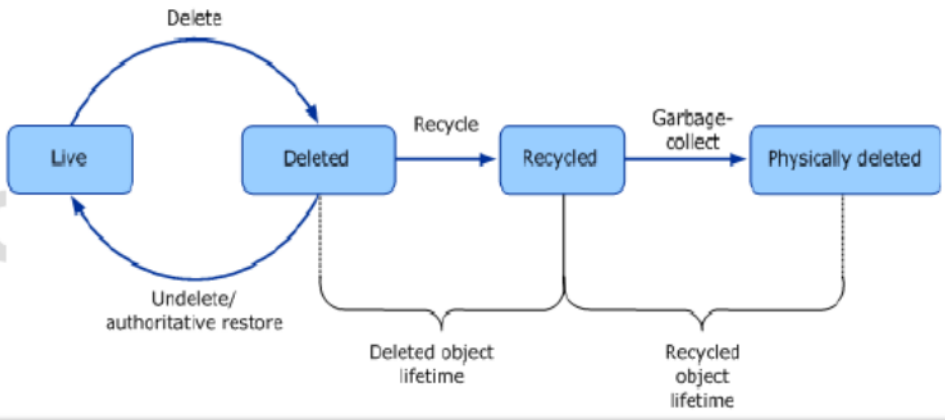
Forest Functional Levels	Supported Domain Functional Levels
Windows Server 2003	Windows Server 2003 Windows Server 2008 Windows Server 2008 R2 Windows Server 2012
Windows Server 2008	Windows Server 2008 Windows Server 2008 R2 Windows Server 2012
Windows Server 2008 R2	Windows Server 2008 R2 Windows Server 2012
Windows Server 2012	Only Windows Server 2012

Domain & Forest Functional Levels

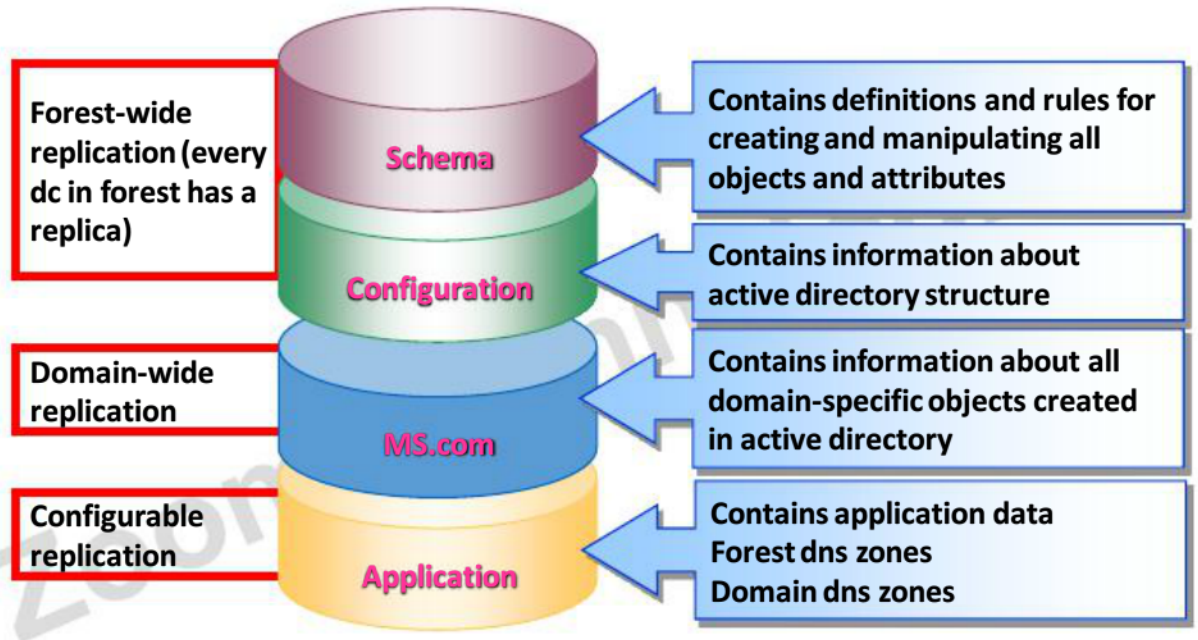
- Domain functional levels can be raised independently of other Domains
- Raising forest functional level is performed by Enterprise Admin
  - Requires all Domain Functional levels to be at Windows Server 2003 or Windows Server 2008 functional levels

Active Directory Recycle Bin

- Active Directory Recycle Bin provides a way to restore deleted objects without AD DS downtime
- Uses Windows PowerShell with Active Directory Module or the Active Directory Administrative Center to restore objects



Directory Partitions



All partitions together comprise the active directory database

Global Catalog

- The global catalog contains Complete information of Host Domain & partial information of other domains in a forest.
- By searching against the GC, individual domains do not have to be queried in most cases- GC can resolve
- Servers that hold a copy of the global catalog are called global catalog servers.

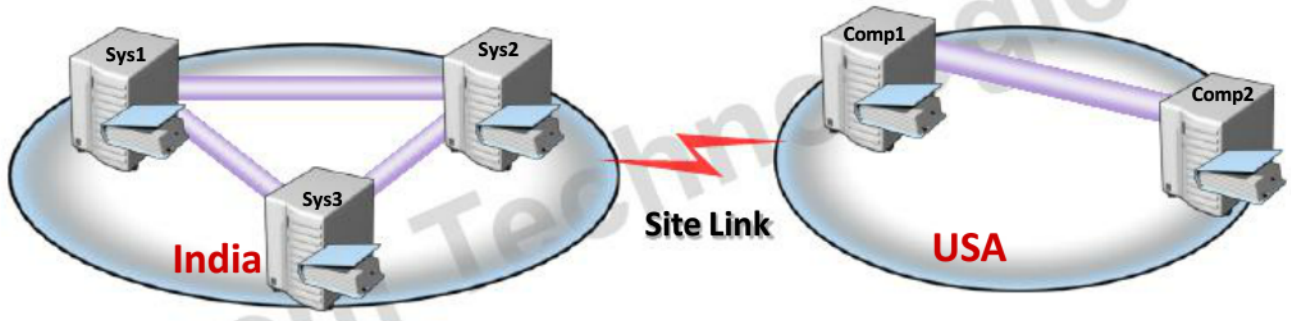
Physical Structure of Active Directory

- Physical Structure
  - Domain Controllers
  - Sites

Sites

- A set of well-connected IP subnets.
- Site can be generally used for locating services (E.g. Logon), replication, group policy application.
- Sites are connected with site links.
- A site can span multiple domains.
- A domain can span multiple sites.

Sites



Read-Only Domain Controllers (RODCs)

- RODC addresses some of the problems that are commonly found in branch offices.
- These locations might not have a DC, Or they might have a writable DC but no physical security to that DC, low network bandwidth, or inadequate expertise to support that DC.

Functionality of RODCs

- Read-only AD DS database
- Uni-directional replication
- Credential caching
- Administrator role separation

Read-only AD DS Database

- Except for account passwords, an RODC holds all the Active Directory objects and attributes that a writable domain controller holds.
- However, changes cannot be made to the database that is stored on the RODC. Changes must be made on a writable domain controller and then replicated back to the RODC.

Uni-directional Replication

- Because no changes are written directly to the RODC, no changes originate at the RODC. Accordingly, writable DCs do not have to pull changes from the RODC. This means that any changes or corruption that a malicious user might make at branch locations cannot replicate from the RODC to the rest of the forest.

Credential Caching

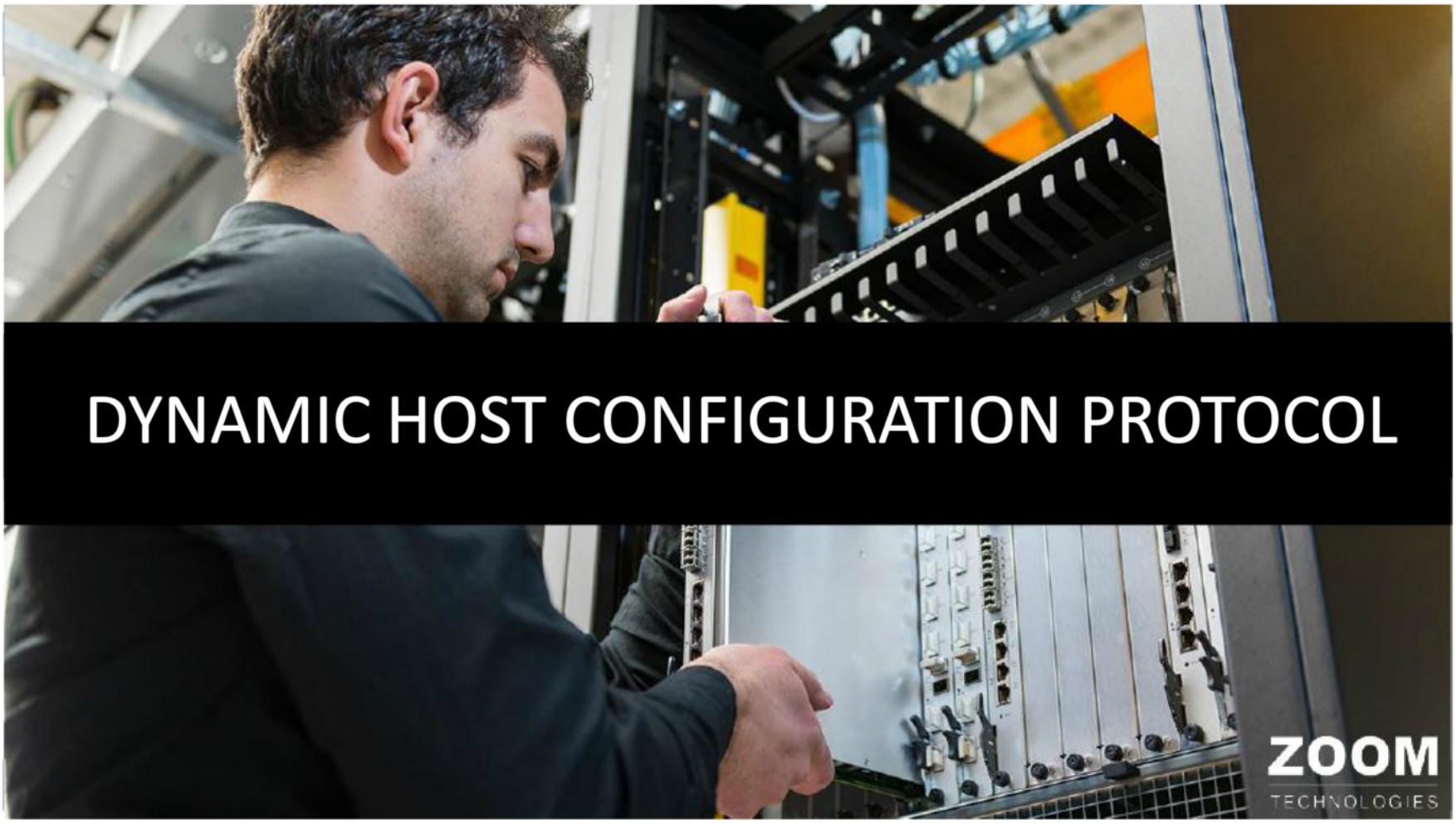
- By default, an RODC does not store any user credentials.
- You must explicitly allow any credential to be cached on an RODC.

Administrator Role Separation

- You can delegate local administrative permissions for an RODC to any domain user without granting that user any user rights for the domain or other domain controllers.
- In this way, the branch user can be delegated the ability to effectively manage and perform maintenance work on the server, such as upgrading a driver in the branch office RODC only, without compromising the security of the rest of the domain

Install From Media

- If you have a network that is slow, unreliable, or costly, you might find it necessary to add another domain controller at a remote location or branch office.
- IFM process must take place over a potentially unreliable WAN connection. As an alternative, and to significantly reduce the amount of traffic copied over the WAN link
- Most of the copying is then done locally (perhaps from a USB drive), and the WAN link is used only for security traffic and to ensure that the new domain controller receives any changes that are made after you create the IFM backup



Types of IP addresses

IP addresses can be

- **Static IP address**
  - **Addresses that are manually assigned and do not change over time**
- **Dynamic IP address**
  - **Addresses that are automatically assigned for a specific period of time and might change**

What is DHCP?

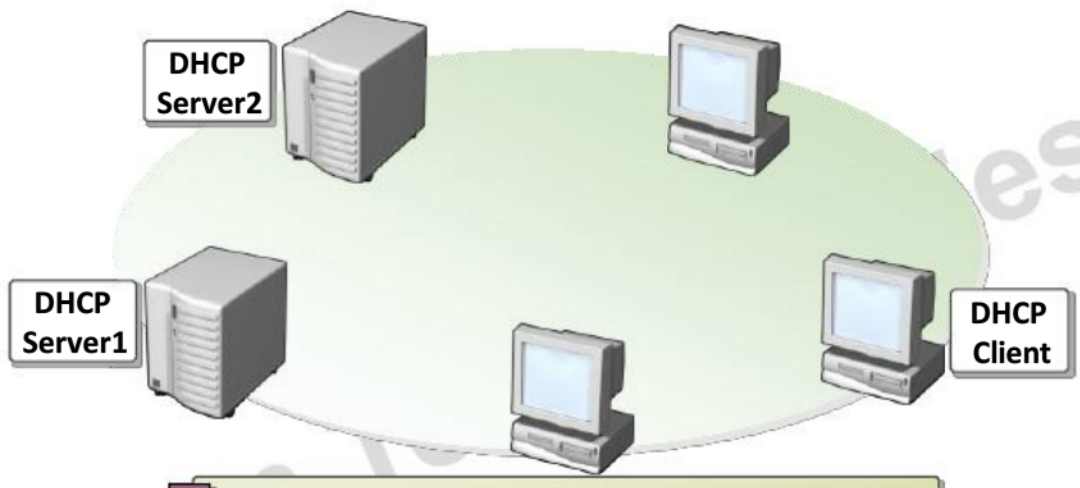
- **It gives IP Addresses automatically to the clients who is requesting for an IP Address**
- **Centralized IP Address management**
- **DHCP prevents IP address conflicts and helps conserve the use of client IP Address on the network**
- **DHCP reduces the complexity and amount of administrative work by assigning TCP/IP configuration automatically to the Clients.**

AUTHORIZATION

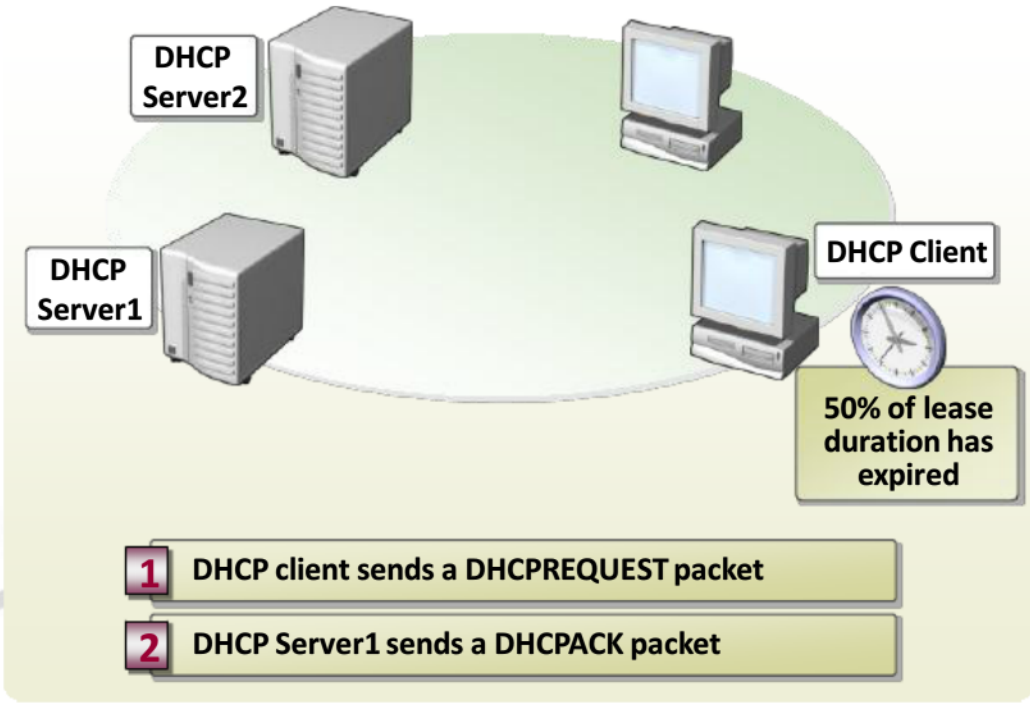
- In Domain model the DHCP server should be authorized to assign the IP Addresses to clients.
- It is a security precaution that ensures that only authorized DHCP servers can run in the network. To avoid computers running illegal DHCP servers in the network.

SCOPE

- A scope is a range of IP addresses that are available to be leased to clients.

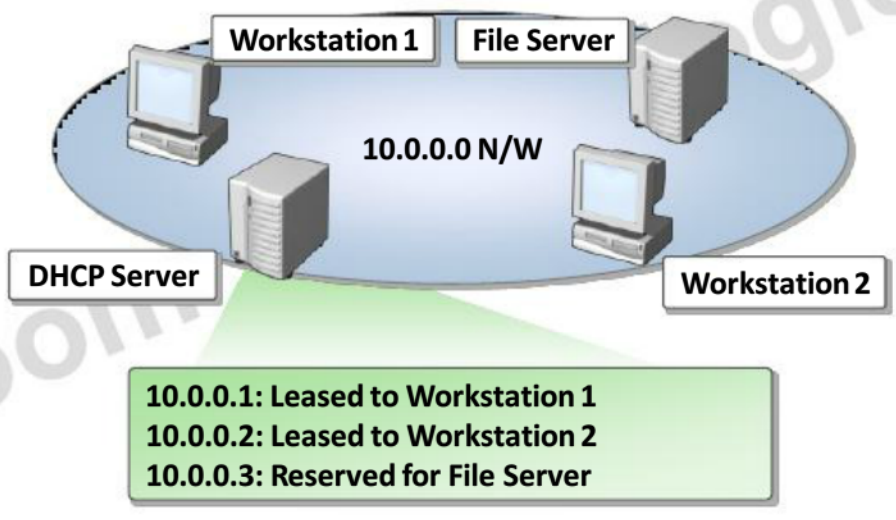


DHCP Lease Renewal Process



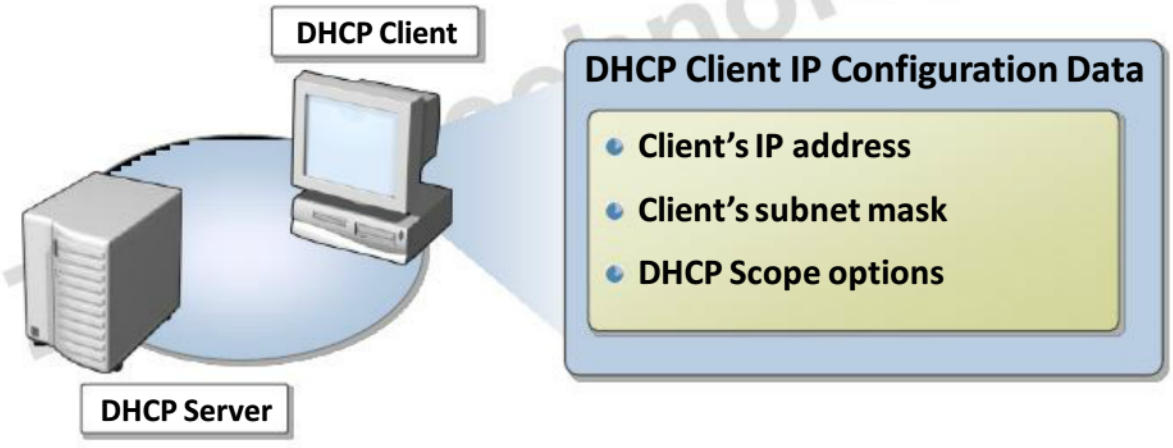
What is DHCP Reservation?

- A reservation is a specific IP address, within a scope, that is permanently reserved to a specific DHCP client



What are DHCP options?

- DHCP Scope options are other server addresses given to clients along with IP Configuration.



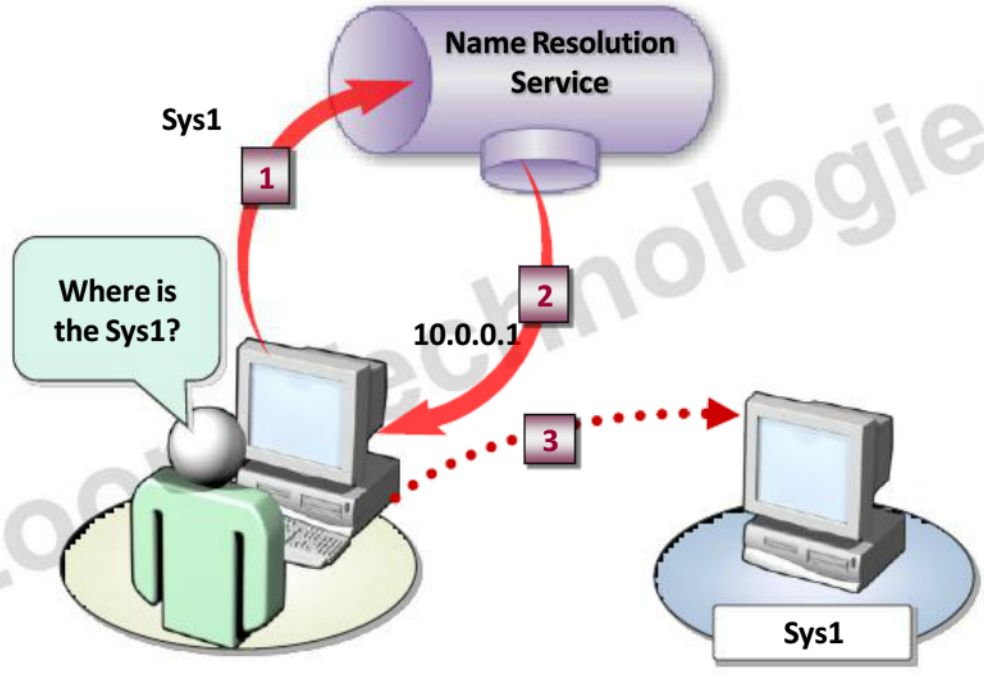
DHCP Failover

- DHCP failover is a new feature available in Windows Server® 2012 ensuring continuous availability of DHCP service to clients.
- With DHCP failover, two DHCP servers share DHCP scope and lease information, enabling one server to provide DHCP leases to DHCP clients if the other server is unavailable
- Hot stand-by mode: This mode provides redundancy for DHCP services.
- Load balance mode: This mode allocates DHCP client leases across two servers.

What is DNS

- Domain Name Service/Domain Name System
- Provides resolution of names to IP addresses and resolution of IP addresses to names
- Defines a hierarchical namespace where each level of the namespace is separated by a "."

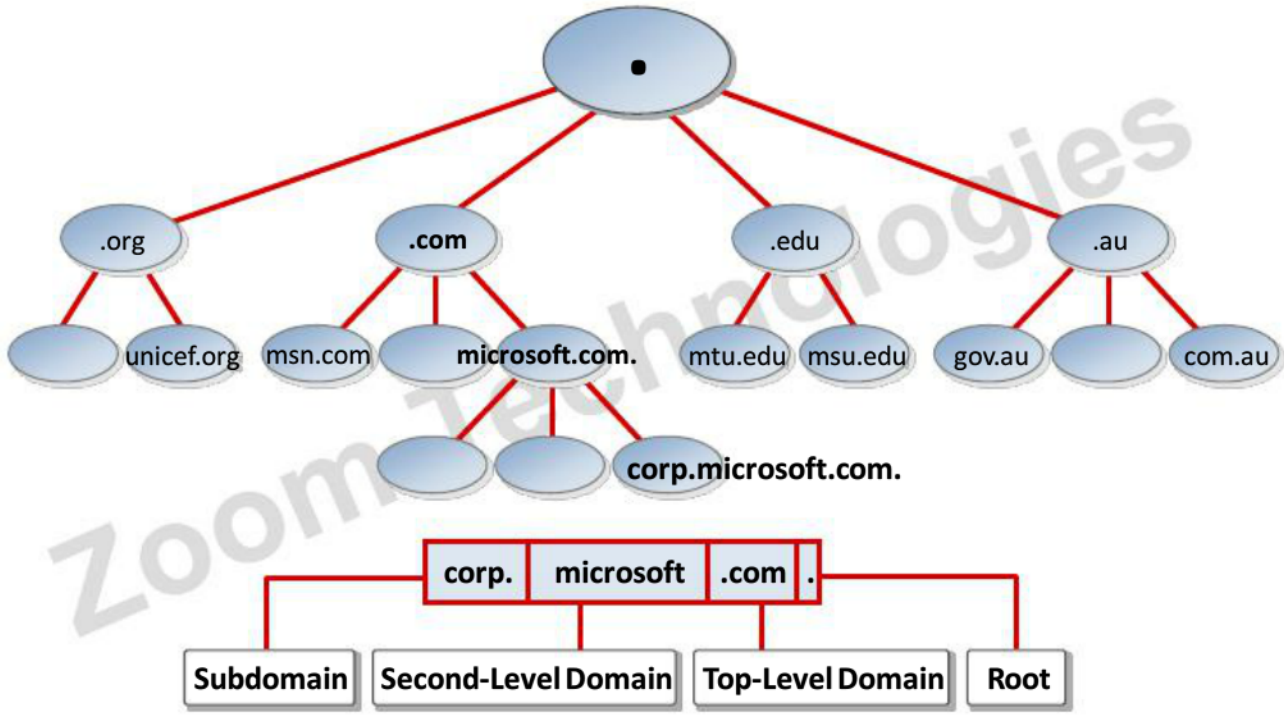
How names are mapped to IP Addresses



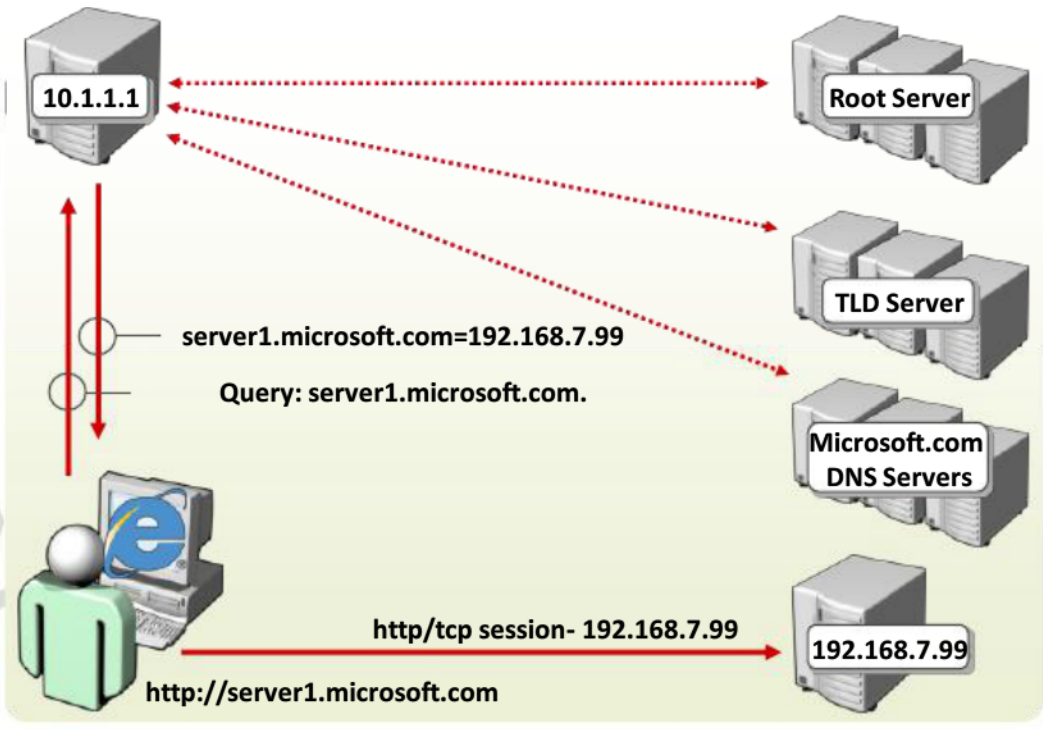
DNS

- Computer running DNS service can be:
  - Microsoft® Windows® Server 2012
  - Microsoft® Windows® Server 2008
  - Microsoft® Windows® Server 2003
  - Microsoft® Windows® 2000 Server
  - Microsoft® Windows® NT 4
  - UNIX
  - Linux
  - NetWare Etc.

DNS Namespace



How DNS Queries Works



Authoritative & Non-authoritative DNS server

- **An authoritative DNS server will either:**
  - Return the requested IP address
  - Return an authoritative "No"
- **An Non-authoritative DNS server will either:**
  - Check its cache
  - Use forwarders
  - Use root hints

Fully Qualified Domain Name (FQDN)

- Identifies a host's name within the DNS namespace hierarchy
- Host name + DNS domain name = FQDN
- Example:
  - Host name: Sys1 & Domain name: MS.com
  - Then FQDN = Sys1.MS.com

Lookup Types

- **Forward Lookup**
  - Requests Name-to-IP Address resolution

- **Reverse Lookup**
  - Requests IP Address to Name resolution

ZONE

Zone is a storage database which contains all zone Records

- **Forward Lookup Zone**
  - Used for Resolving Host Names to IP-Address
  - It maintains Host to IP Address Mapping Information
- **Reverse Lookup Zone**
  - Used for Resolving IP-Address to Host Names
  - It maintains IP Address to Host Mapping Information

Types of Records

- **SOA Record**
  - The first record in any zone file
- **N S Record**
  - Identifies the DNS server for each zone
- **Host Record**
  - Resolves a host name to an IP address
- **Alias Record**
  - Resolves an alias name to a host name

Types of Records

- **Pointer Record**
  - Resolves an IP address to a host name
- **MX Record**
  - Used by the mail server
- **SRV Records (Service Records)**
  - Resolves names of servers providing services

Zoom Technologies

CLOUD EXCHANGE M C S E

Zone Types

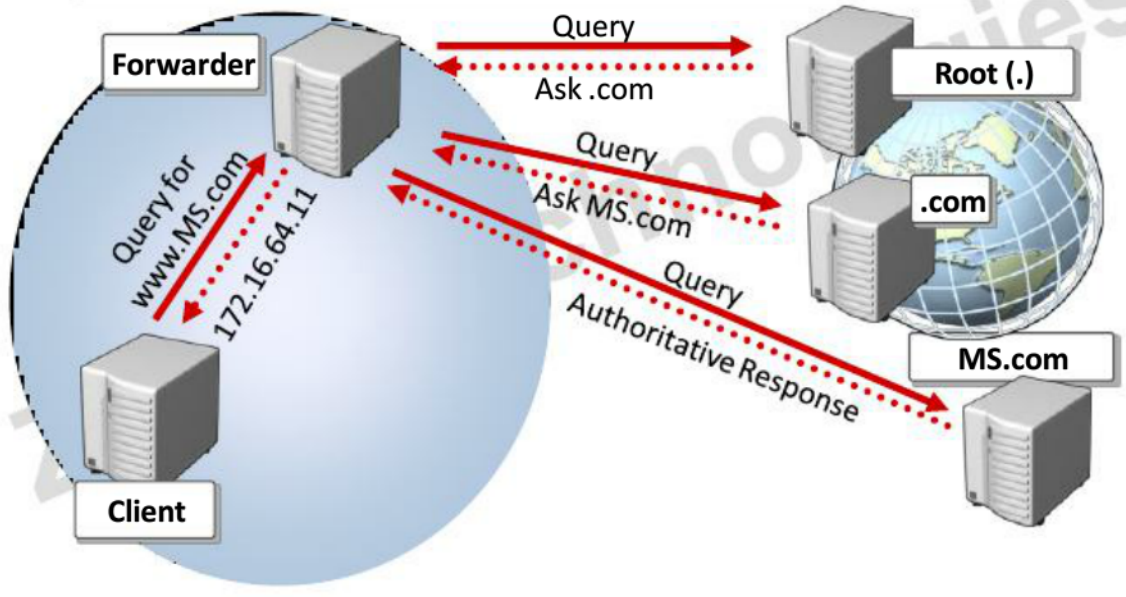
- **Standard Primary**
  - It is the Master Copy of all Zone Information. It is Read/Write copy
- **Standard Secondary**
  - It is Backup to Primary zone. It is Read Only
- **Stub Zone**
  - It contains only NS ,SOA & possibly Glue (A) Records which are used to locate name servers
- **Active Directory Integrated**
  - It stores the information of Zone in ACTIVE DIRECTORY DATABASE

What are Service Records

- SRV records allow DNS clients to locate TCP/IP-based Services.
- SRV records are used when:
  - A domain controller needs to replicate
  - A client searches Active Directory
  - A user attempts to change her password
  - An administrator modifies Active Directory

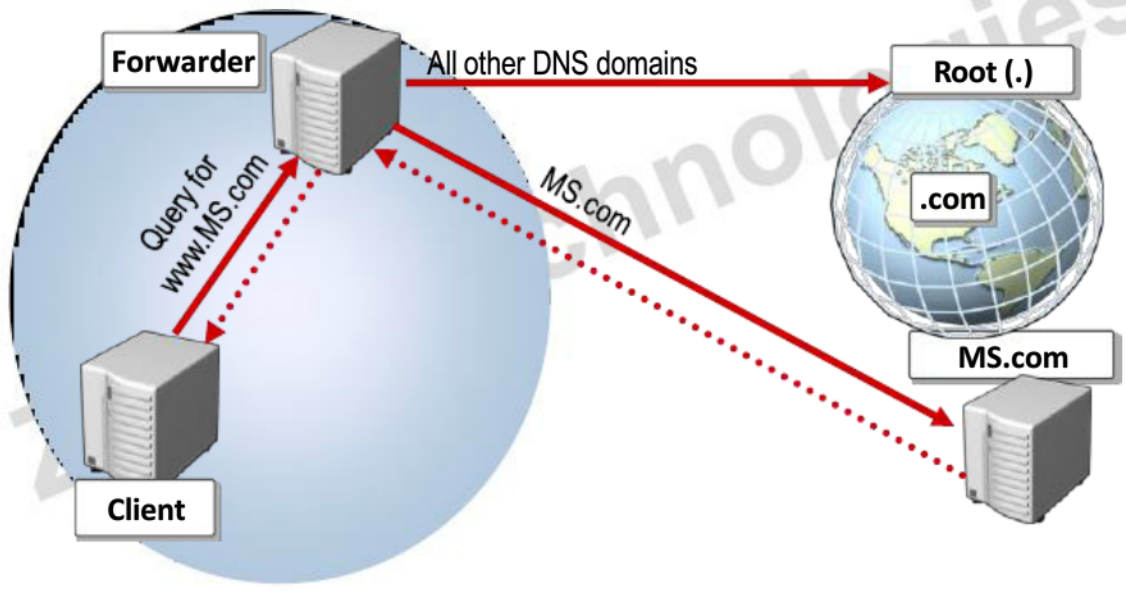
How Forwarders works

A *forwarder* is a DNS server designated to resolve external DNS domain names

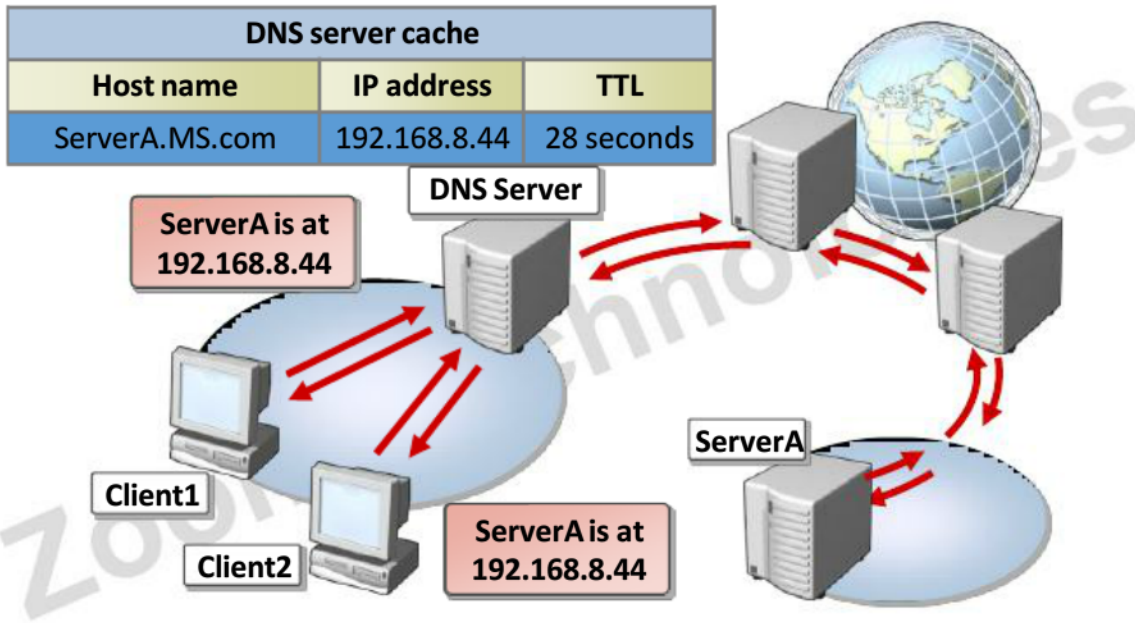


How Conditional Forwarders works

Conditional forwarding forwards requests using a domain name condition



How DNS Server Caching Works



Internet Information Services (IIS)

- IIS is a service which is used to host the information over internet.
- It provides integrated, reliable, scalable and manageable Web server capabilities over an intranet / internet.

Versions of IIS

- IIS 2.0 in Windows NT 4.0 Operating System
- IIS 5.0 in Windows 2000 Operating System
- IIS 6.0 in Windows 2003 Operating System
- IIS 7.0 in Windows 2008 Operating System
- IIS 8.0 in Windows 2012 Operating System

Features Of IIS 8.0

- Supports IPv6
- Backup & Restoration of website configuration is automatic.
- Isolation of Users
- Support for Application Developers & Programmers

IIS 7.0 Services

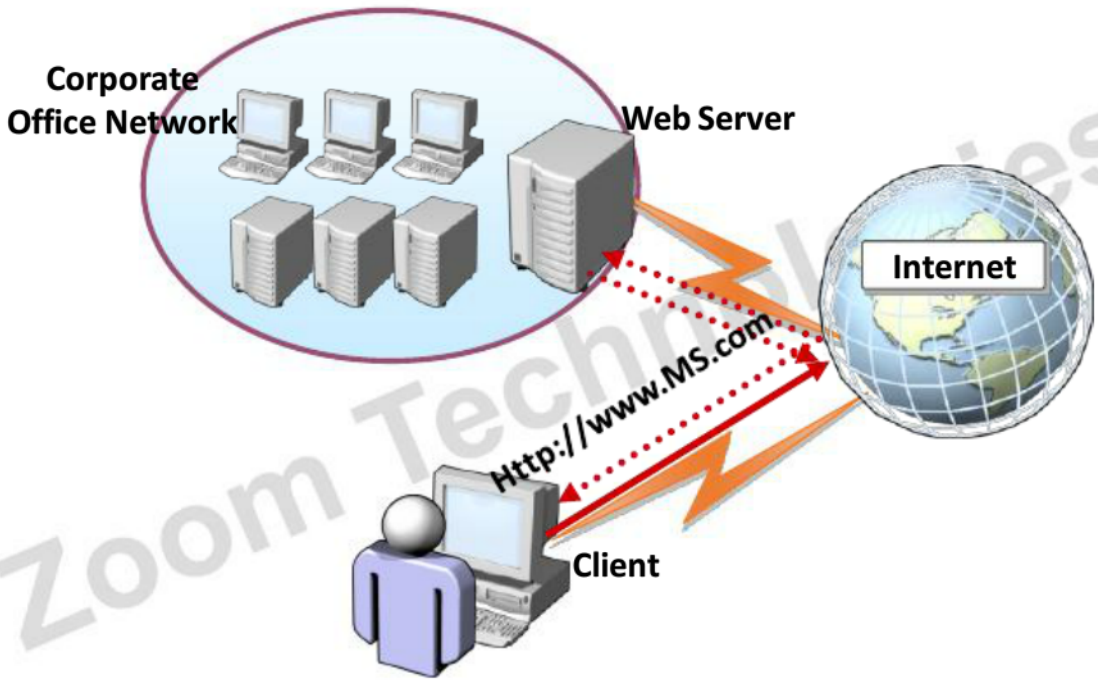
- World Wide Web (WWW) publishing service (HTTP)
- File Transfer Protocol (FTP) service

Hyper-Text Transfer Protocol

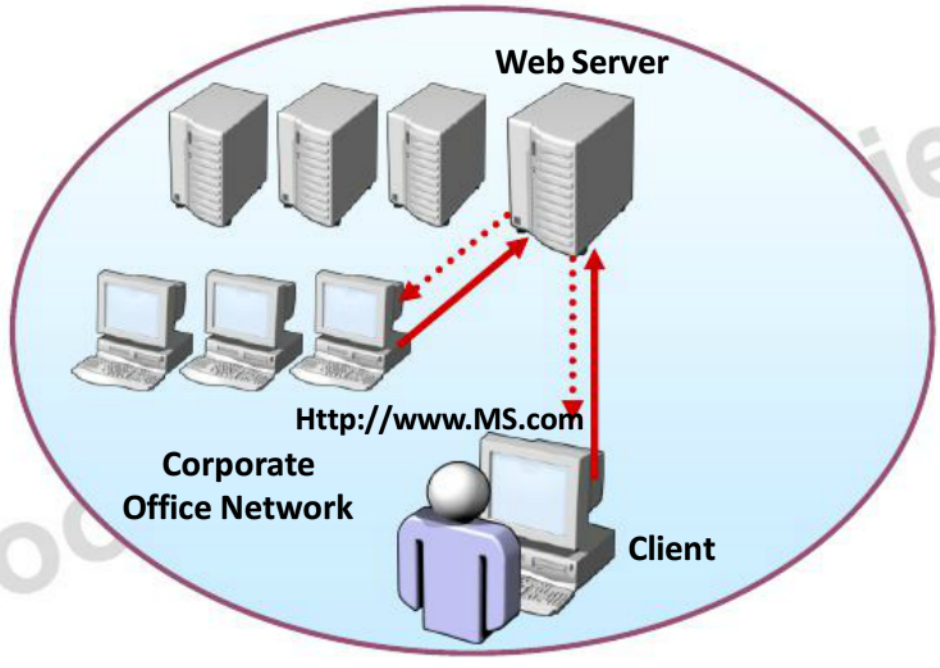
World Wide Web (WWW) publishing service (HTTP)

- **Http service is used to publish data to World Wide Web quickly & easily.**
- **This protocol is easily configurable and it supports security and encryption to protect sensitive data.**
- **Default Port No is 80**

Internet Web Server



Intranet Web Server



Requirements to Host WEB SERVER

- Static IP Address (Public IP if published over Internet)
- Domain name (Registered Domain name if Published over Internet)
- Name Resolution Service like DNS
- Home Directory
  - Required for each Web site
  - Central location of published pages

Virtual Directory

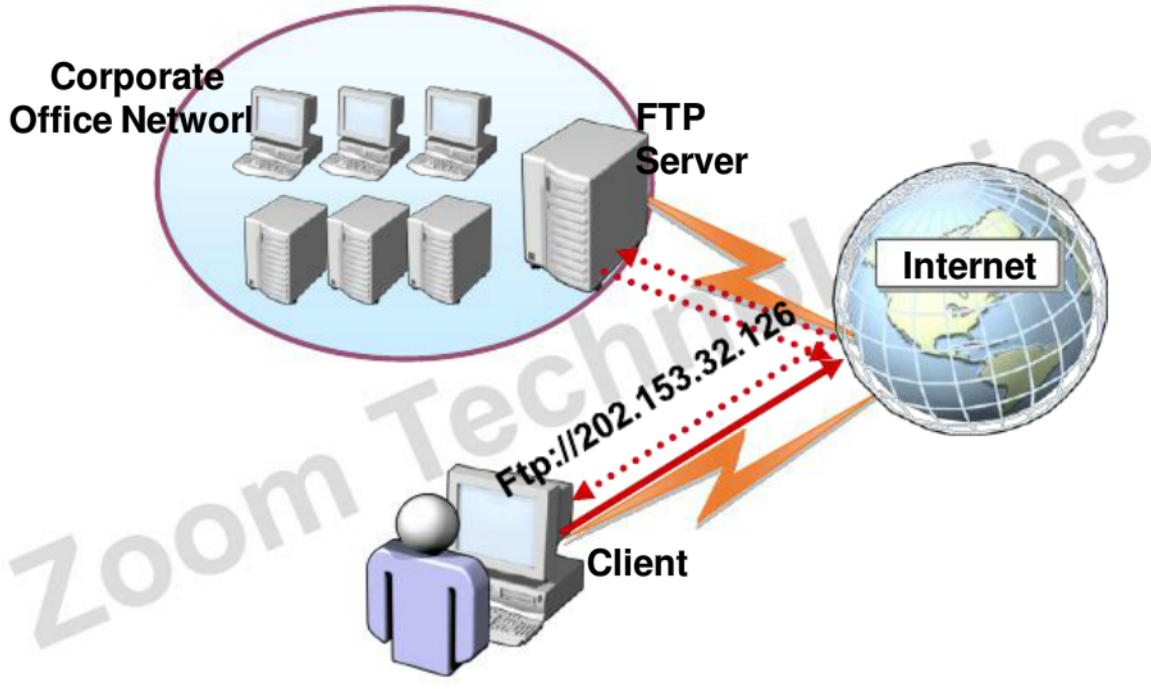
- Virtual Directories are sub directories of the root of the web site.
- By using Virtual directories we can create alias or pointer to a directory somewhere else in the same system or another system on the network.

FTP

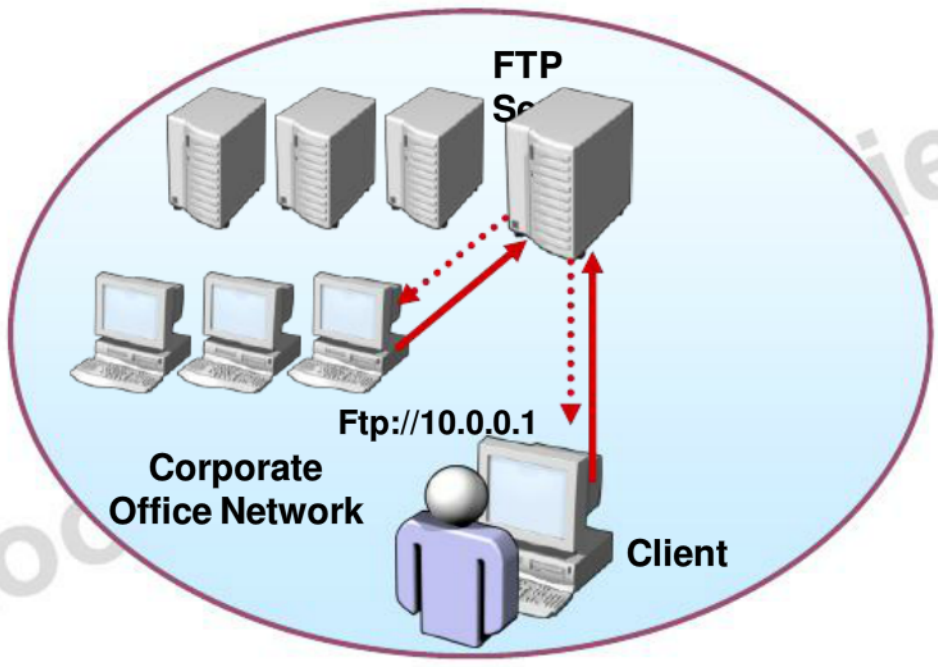
File Transfer Protocol (FTP) service

- It is a protocol used to download and upload the files over the internet.
- Default Port No is 21

Internet FTP Server

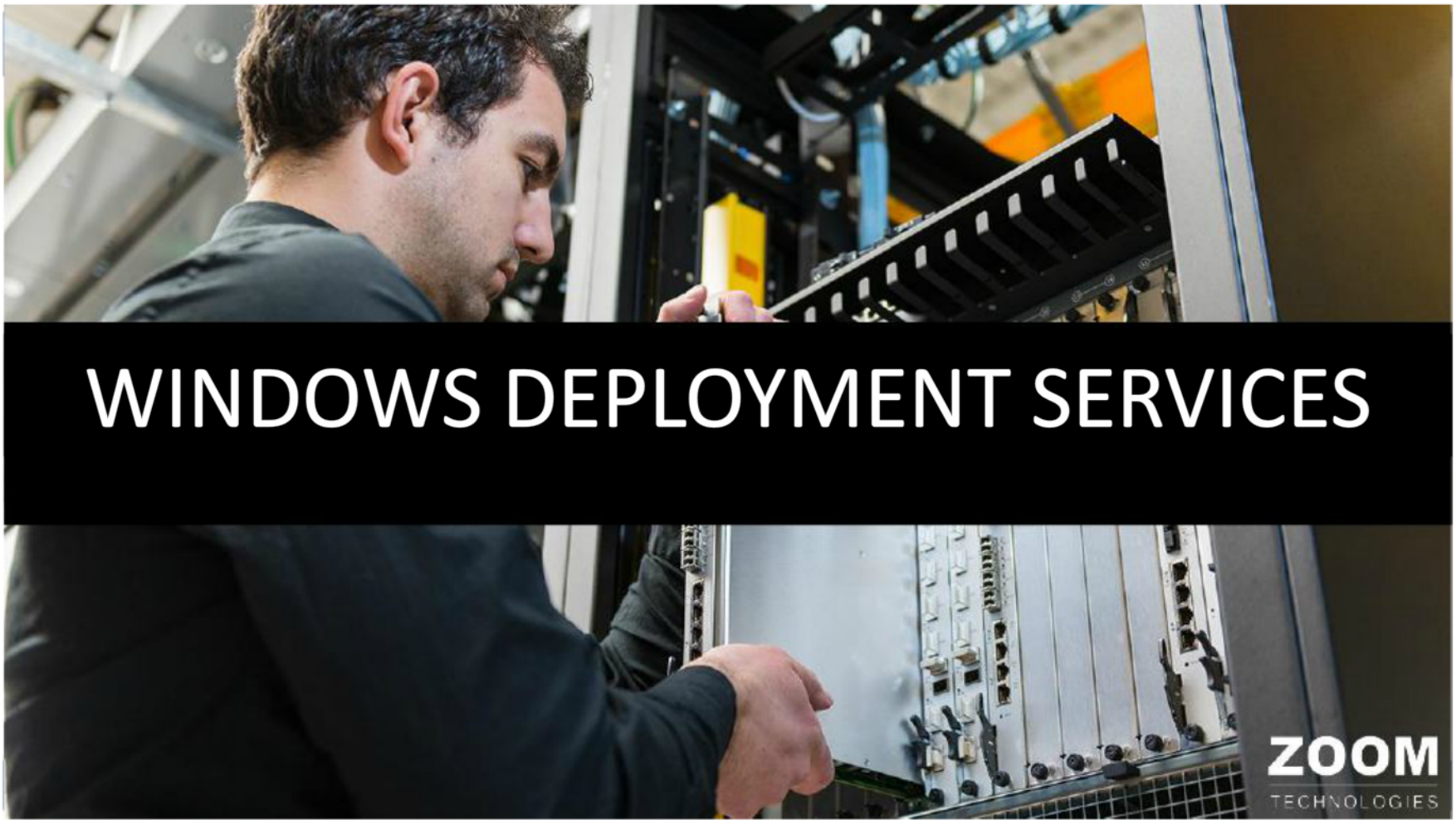


Intranet FTP Server



Requirements to Host FTP SERVER

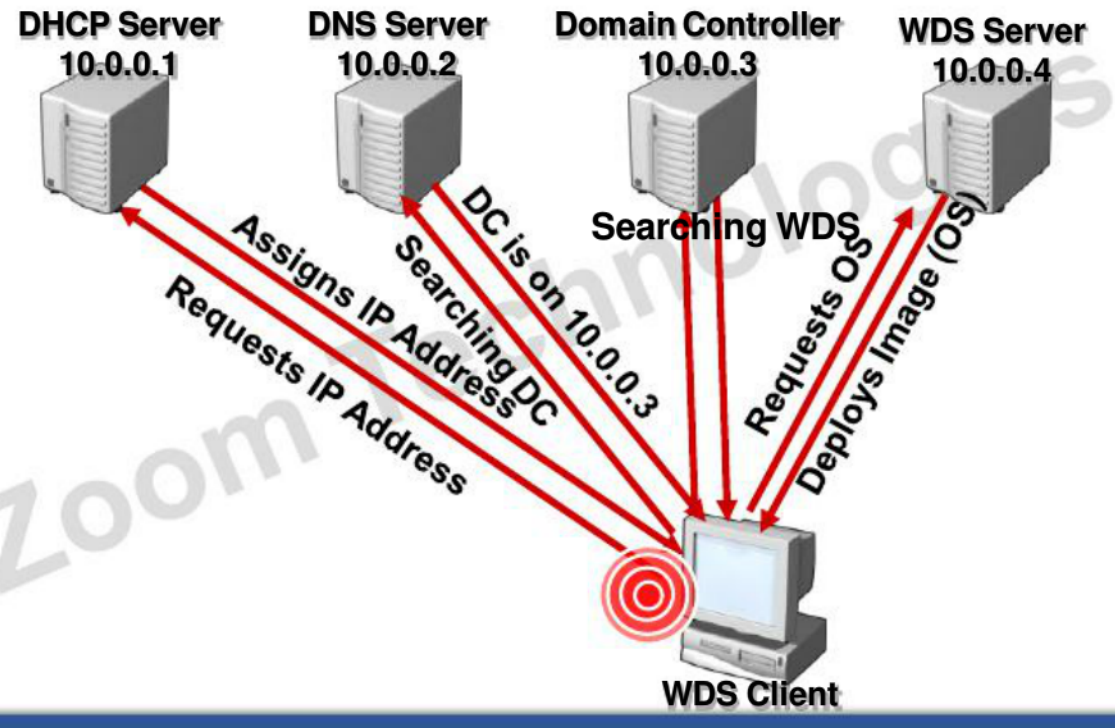
- Static IP Address (Public IP if published over Internet)
- Home Directory
  - Required for each FTP site
  - Central location of published pages



Requirements of WDS- Deployment Server

- DHCP Server
- DNS Server
- Active Directory – Domain Services
- An NTFS Partition to Store Images

How WDS Works?



Types of Clients

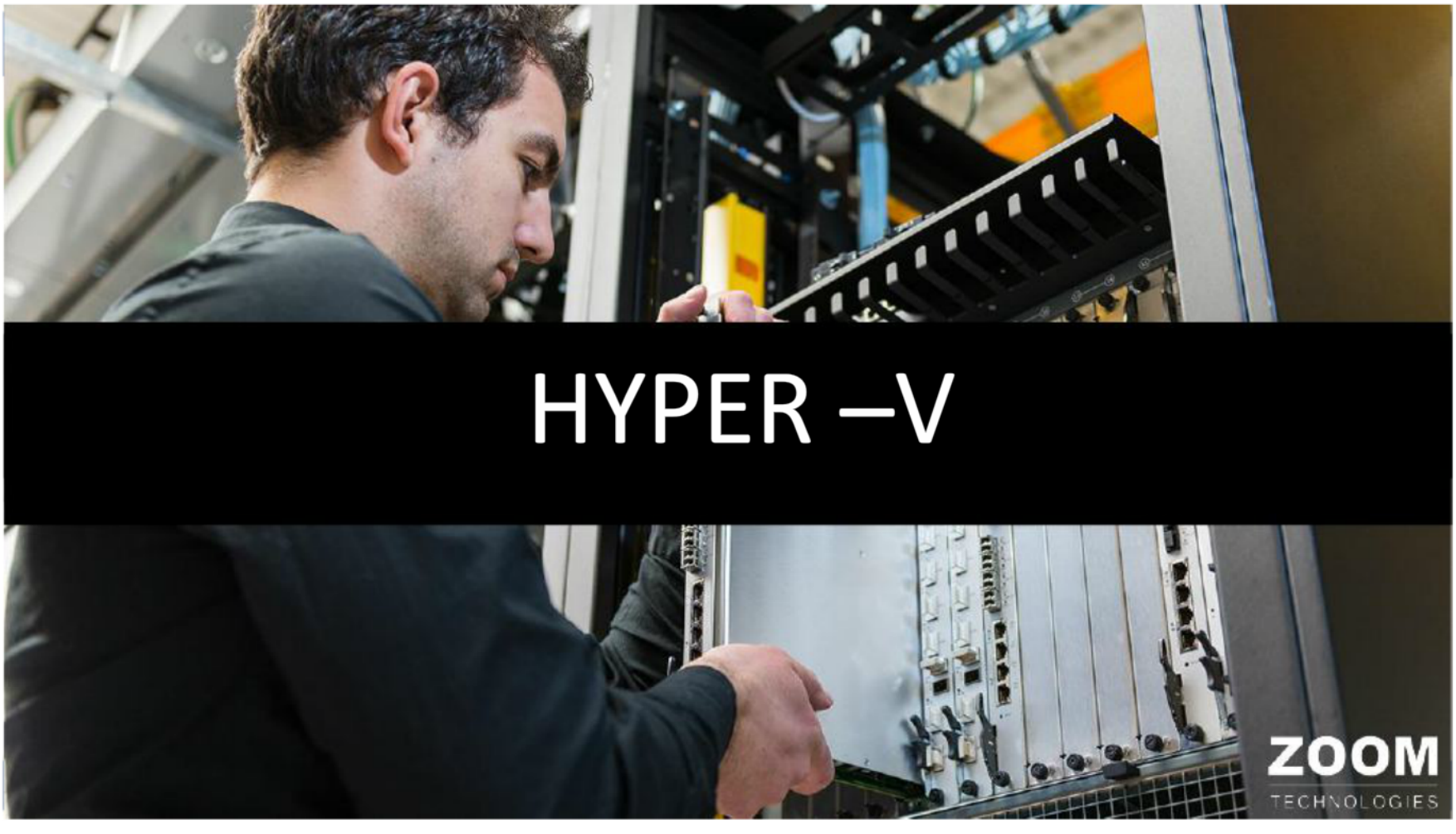
- Known Clients
  - A Known Client Computer is one whose computer account has been pre-created (Pre-Staged) in Active directory.
- Un-Known Clients
  - An un-known Client Computer is one whose computer account has not been pre-staged in Active directory.

Types of Images

- Boot Image
  - It is a WIM file you can use to boot a computer to begin the deployment of an O.S to the computer.
- Install Image
  - It is a image of Windows Vista or Windows server 2008 O.S itself that you want to deploy onto the client computer.

Types of Images

- Capture Image
  - It is a special boot image that you use to boot a master computer and upload an image to a WDS server.
- Discover Image
  - It is a boot image that you use to deploy an install image onto a computer that is not PXE enabled.



Hyper-V

- Hyper-V is the hardware virtualization role that is available in Windows Server 2012.
- Hardware virtualization provides virtual machines with direct access to the virtualization server's hardware.
- This is in contrast to software virtualization products such as Microsoft Virtual Server 2005 R2, that use the virtualization server's operating system to provide indirect access to the server's hardware.

Type-I Hypervisor

- Also called as bare metal virtualization.
- Hypervisor is directly installed on hardware.
- Robust
- Used in production environment.

Company Name	Hypervisor Name
Microsoft	Hyper-V
Vmware	Esxi
Citrix	Xen Server

Type-II Hypervisors

- Hosted virtualization.
- Slow
- Testing and lab.

Company Name	Hypervisor Name
Microsoft	Virtual Server
VM Ware	Workstation
Oracle	Oracle Virtual Box

Hardware Requirements

- The server must have an x64 platform that supports hardware assisted virtualization and Data Execution Prevention.
- The server must have enough CPU capacity to meet the requirements of the guest virtual machines.
  - A virtual machine hosted on Hyper-V in Windows Server 2012 can support up to 64 virtual processor

Hardware Requirements

- The server must have enough memory to support all of the virtual machines that must run concurrently, plus enough memory to run the host Windows Server 2012 operating system.
  - The server must have at least 4 GB of RAM.
  - A virtual machine hosted on Hyper-V in Windows Server 2012 can support a maximum of 1 terabytes (TB) of RAM

Hardware Requirements

- The storage subsystem performance must meet the input/output (I/O) needs of the guest virtual machines. Whether deployed locally or on storage area networks (SANs), you may have to place different virtual machines on separate physical disks, or you may have to deploy a high performance redundant array of independent disks (RAID), solid-state drives (SSD), hybrid-SSD, or a combination of all

Zoom Technologies

Hardware Requirements

- The virtualization server's network adapters must be able to support the network throughput needs of the guest virtual machines. You can improve network performance by installing multiple network adapters and using multiple Network Interface Cards (NICs).

Virtual Machine Hardware

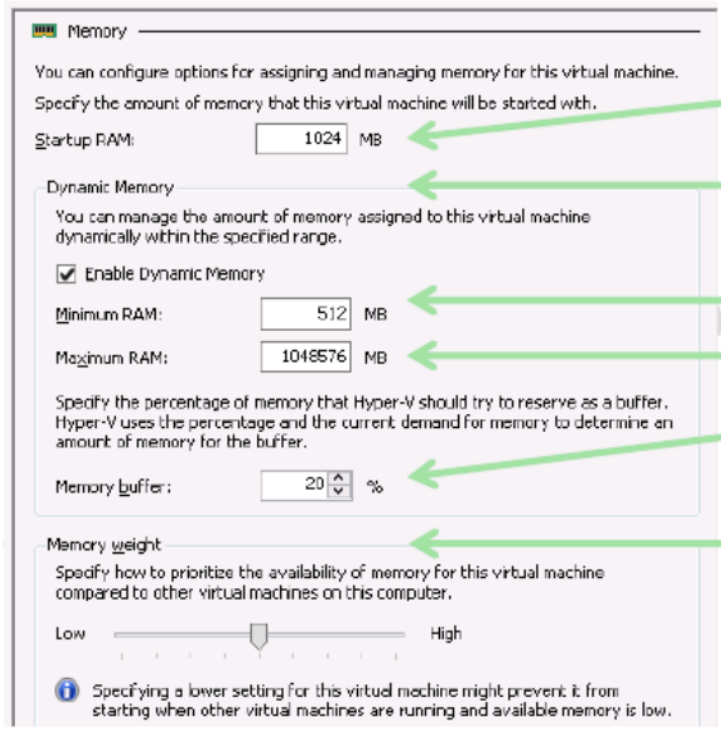
Virtual machines have the following simulated hardware by default:

- BIOS
- Memory
- Processor
- IDE Controller 0 and 1
- SCSI Controller
- Synthetic Network Adapter
- COM 1 and 2
- Diskette Drive

You can add the following hardware to a virtual machine:

- SCSI Controller (up to 4)
- Network Adapter
- Legacy Network Adapter
- Fibre Channel adapter
- RemoteFX 3D video adapter

Dynamic Memory for Virtual Machines



Startup RAM

Dynamic Memory

Minimum RAM

Maximum RAM

Memory buffer

Memory weight

What Is a VHD?

- A virtual hard disk is a file that represents a traditional hard disk drive
- VHDX format has the following benefits over the VHD format:
  - The disks can be larger (64 TB versus 2 TB)
  - The disk is less likely to become corrupted
  - The format supports better alignment when deployed to a large sector disk
  - The format supports larger block size for dynamic and differencing disks

Creating Virtual Disk Types

- Dynamically expanding VHDs
- Fixed-size VHDs
- Direct-attached storage

Pass -through Disk

- Hyper-V allows virtual machines to access storage mapped directly to the Hyper-V server without requiring the volume be configured.
- The storage can either be a physical disk internal to the Hyper-V server or it can be a Storage Area Network (SAN) Logical Unit (LUN) mapped to the Hyper-V server.
- To ensure the Guest has exclusive access to the storage, it must be placed in an Offline state from the Hyper-V server perspective.

Differencing VHDs

- Differencing disks reduce space used by storage at the cost of performance
- You can link multiple differencing disks to a single parent disk
- You cannot modify parent disk
- You can use Inspect Disk tool to reconnect a differencing disk to a missing parent

Virtual Switch

- External

  Used to map a network to a specific network adapter or network adapter team
- Internal

  Used to communicate between the virtual machines on the host and between the virtual machines and the host itself
- Private

  Used to communicate between virtual machines, but not between the virtual machines and the host itself

Definition

ROUTER

It is a device used to communicate between two different networks.

ROUTING

It is a process of sending the data packets through the best path to reach the destination.

DEFAULT GATEWAY

It gives the exit point (or) entry point to reach the destination.

Types of Routing

Static Routing

Routes should be added manually on the router by the administrator.

Dynamic Routing

Routes will be added automatically by the router with the help of routing protocols

Types of Routers

Software Router

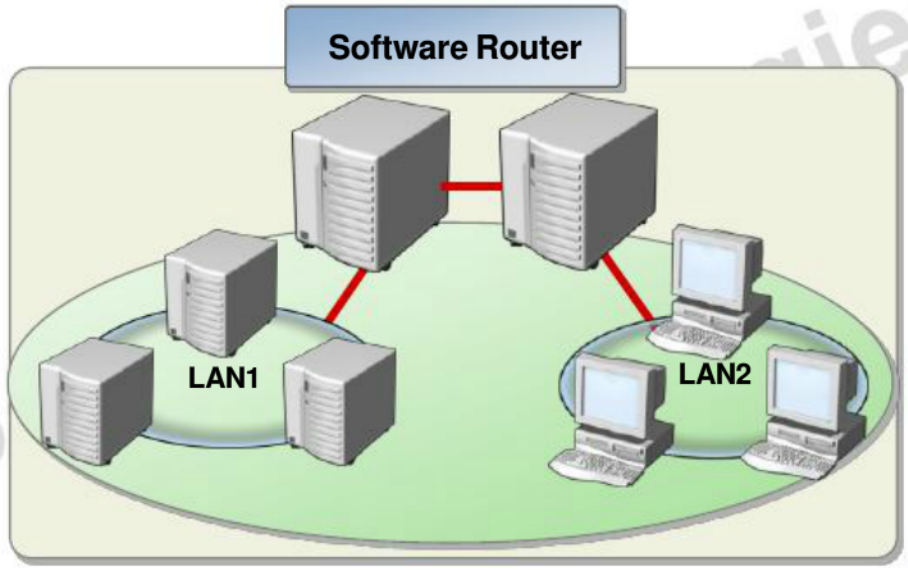
It is a computer which performs routing task as one of its multiple tasks.

Hardware Router

It is a Dedicated HARDWARE DEVICE which works only as a router.

Routing and Remote Access Service (RRAS)

- Routing and Remote Access is a service that performs routing as one of its multiple processes.

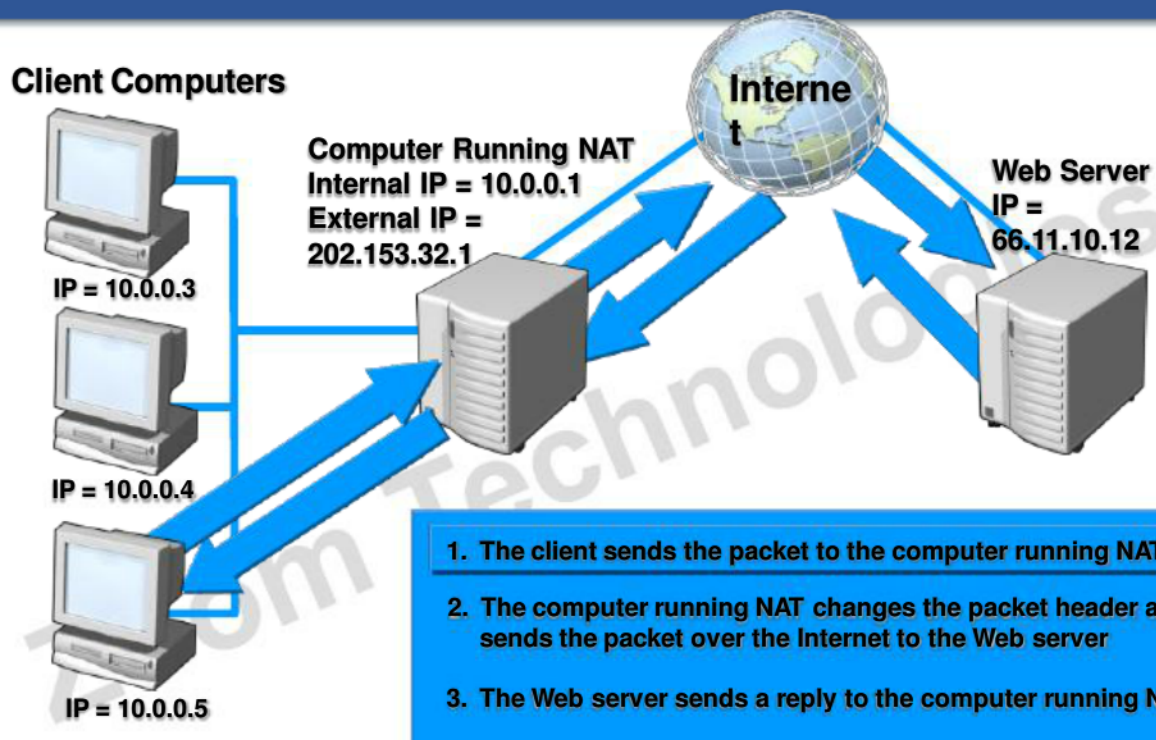


NAT

NETWORK ADDRESS TRANSLATION

- Provides access to Internet from a protected private address range
- Translates Private IP's to Public IP's & vice-versa for outgoing and incoming traffic
- Hides private IP address range from the Internet
- Can be used with DHCP or can be configured to assign IP to Client

How NAT works?

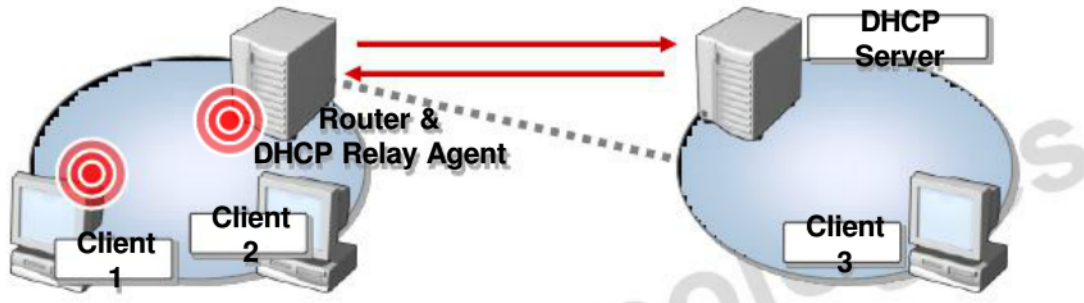


1. The client sends the packet to the computer running NAT
2. The computer running NAT changes the packet header and sends the packet over the Internet to the Web server
3. The Web server sends a reply to the computer running NAT
4. The computer running NAT determines the destination, changes the packet header, and sends the packet to the client

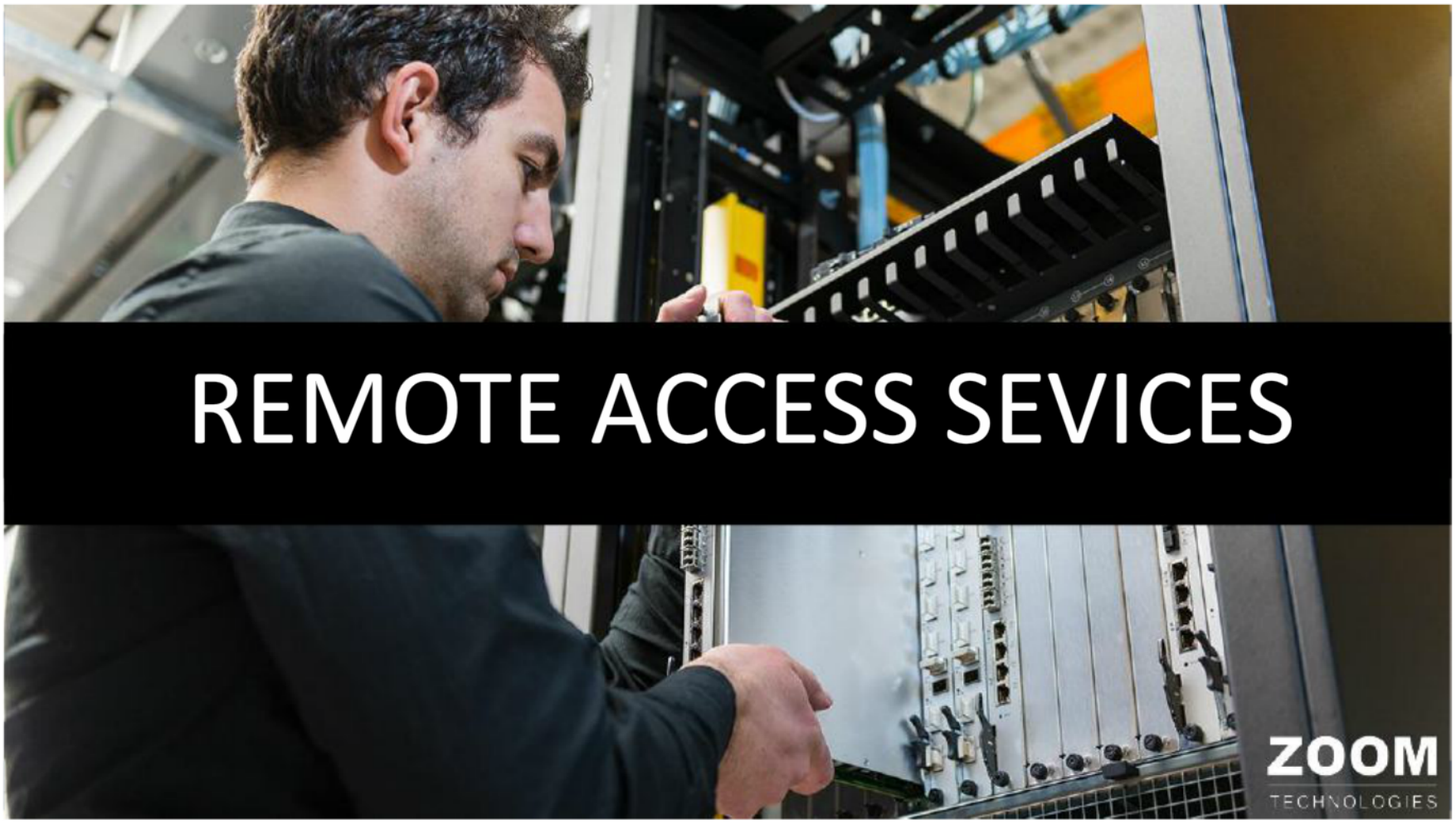
DHCP Relay Agent

- A DHCP Relay agent is a computer or router that listens for DHCP Broadcasts from DHCP clients and then relays(sends) those messages to DHCP Servers on the another network.

How a DHCP Relay Agent Works?

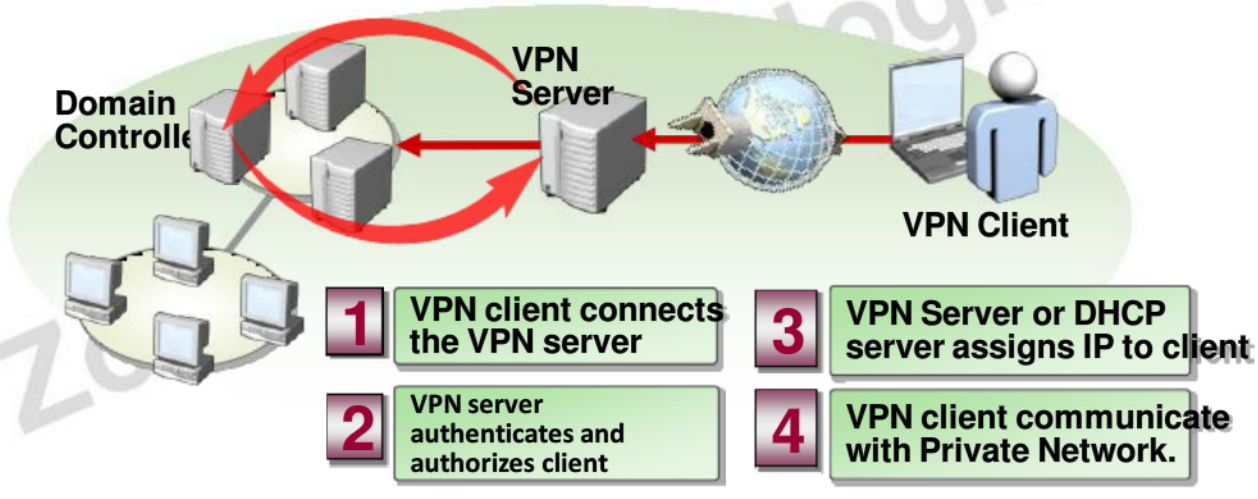


1. Client1 broadcasts a DHCPDISCOVER packet
2. Relay agent forwards the DHCPDISCOVER message to the DHCP server
3. Server sends a DHCPOFFER message to the DHCP relay agent
4. Relay agent broadcasts the DHCPOFFER packet
5. Client1 broadcasts a DHCPREQUEST packet
6. Relay agent forwards the DHCPREQUEST message to the DHCP server
7. Server sends a DHCPACK message to the DHCP relay agent
8. Relay agent broadcasts the DHCPACK packet

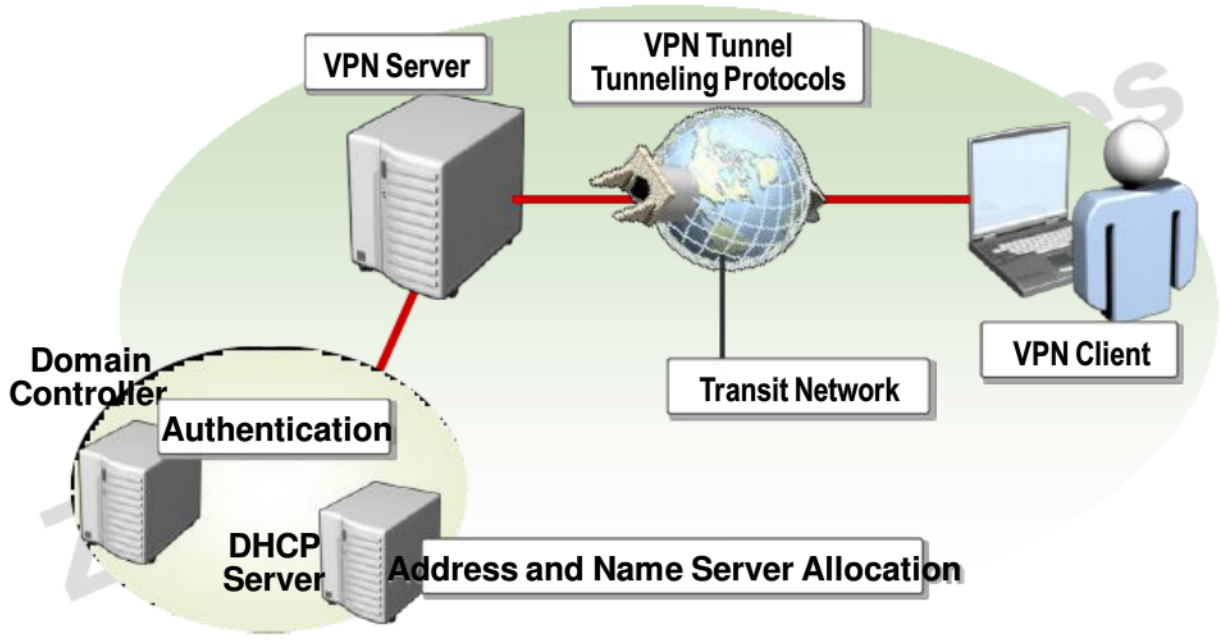


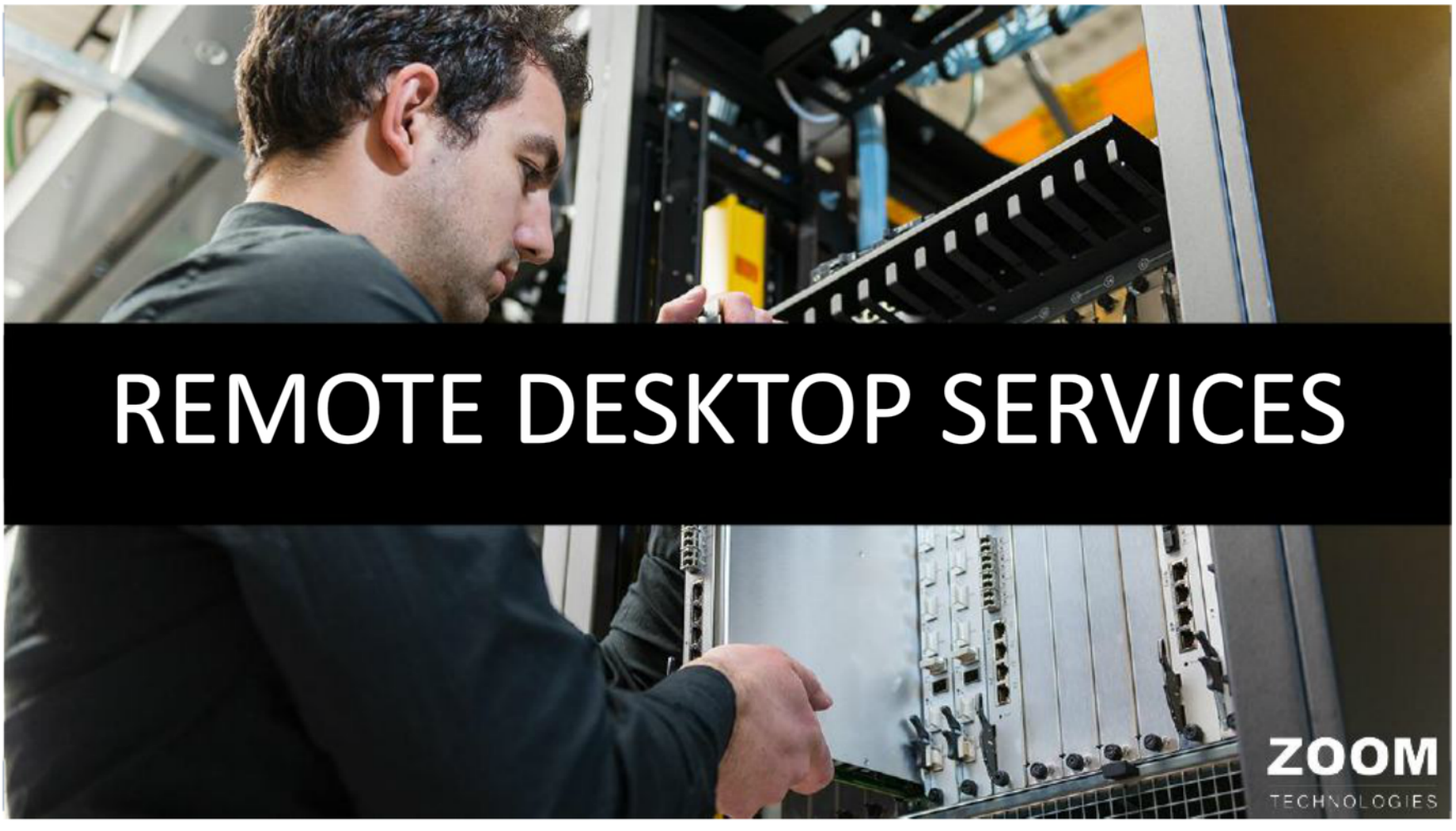
How a VPN Connection Works

- A VPN extends a private network across shared or public networks such as the Internet.

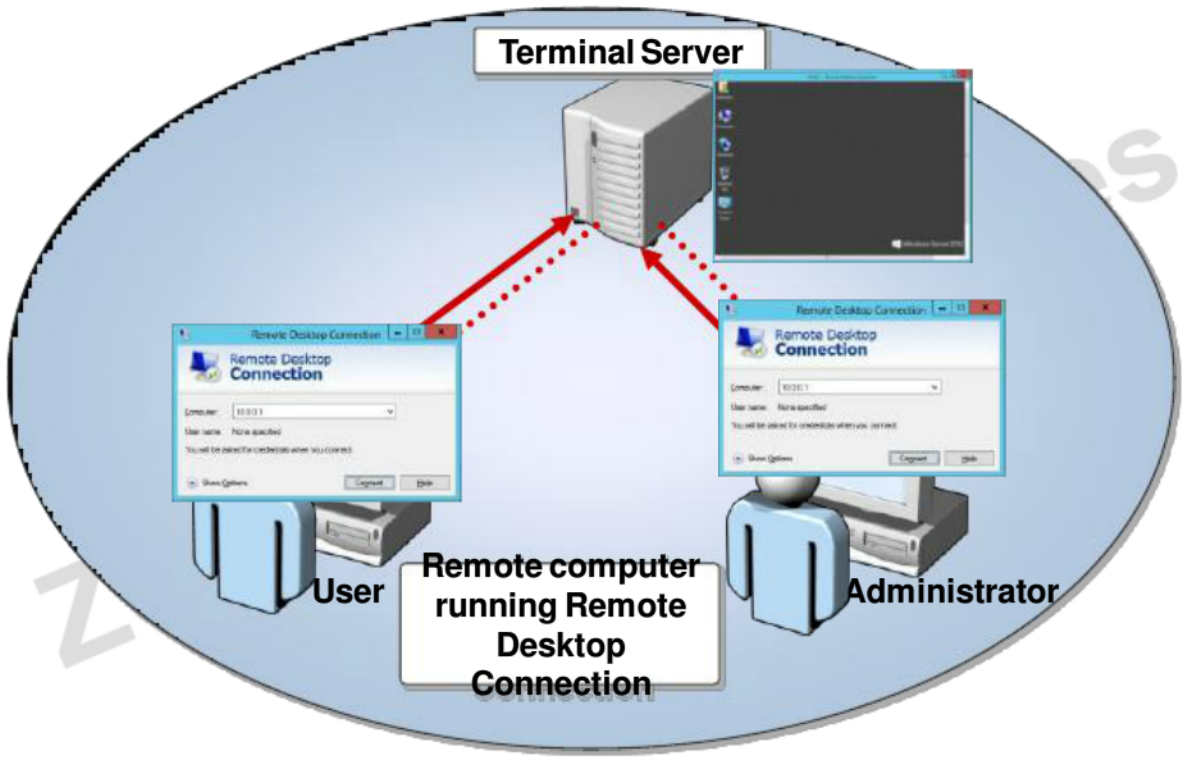


Components of a VPN Connection





What is Remote Desktop Service?

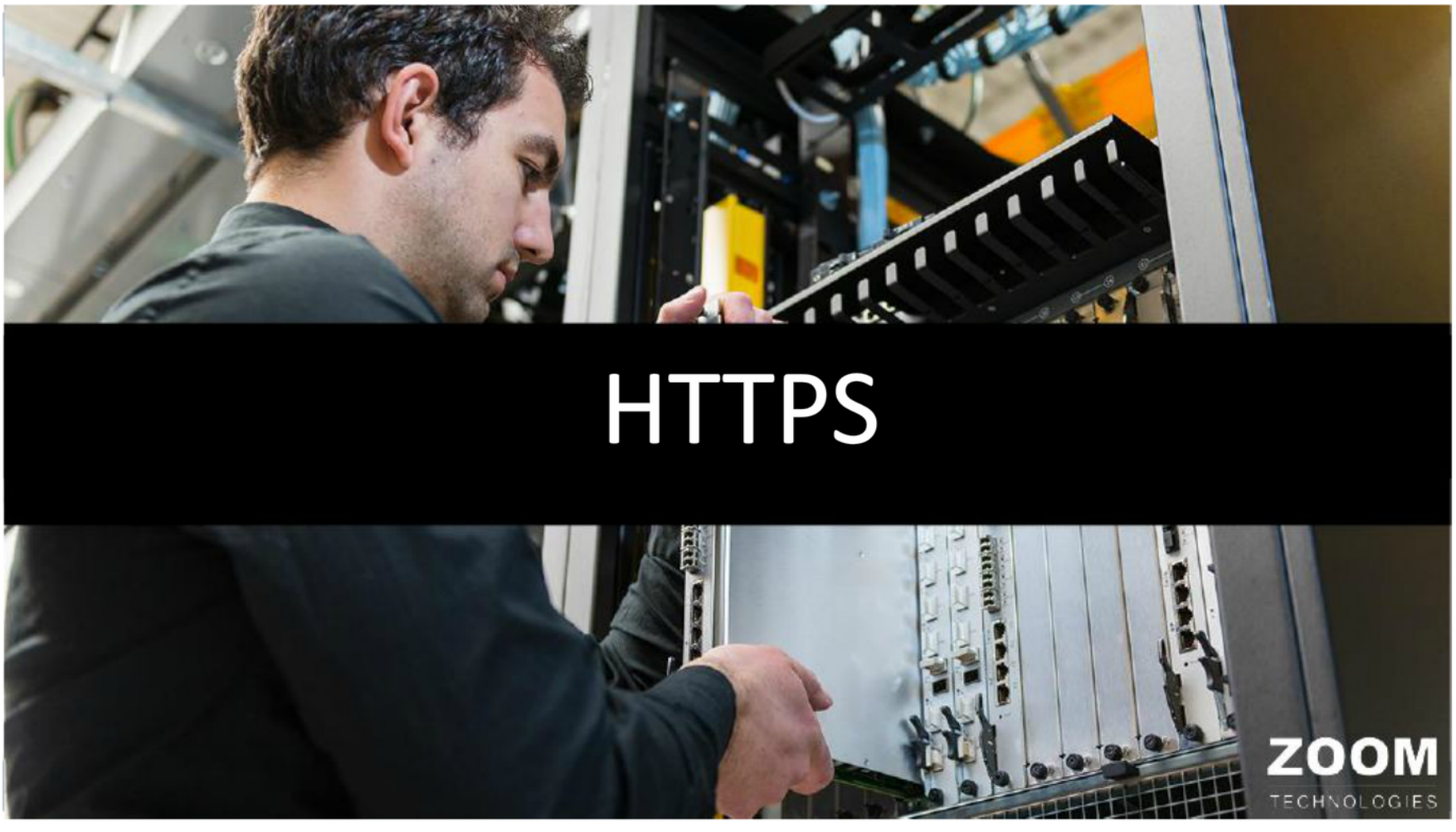


Modes of Remote Desktop Services

- Remote Administration Mode
  - Specially designed for remote management of server.
  - Only two connections are Supported.
  - License is not required.

Remote Desktop Services Sessions

- Disconnect Session
  - If the Session is disconnected all the programs will continue to run in the background & the user can reconnect to same session
- Logoff Session
  - If the Session is logged off then all programs will be closed and next time new session will be established.



HTTPS

Hypertext Transfer Protocol over Secure Socket Layer (SSL)

- **HTTPS encrypts and decrypts the information between the client browser and the web server using a secure Socket Layer (SSL).**
- **SSL transactions are encrypted between the client and the server, this is usually 40 or 128 bit encryption (the higher the number of bits the more secure the transaction).**

HTTPS

- SSL Certificate is issued by a trusted source, known as the Certification Authority (CA).
- CAs verifies the existence of your business, the ownership of your domain name, and your authority to apply for the certificate.

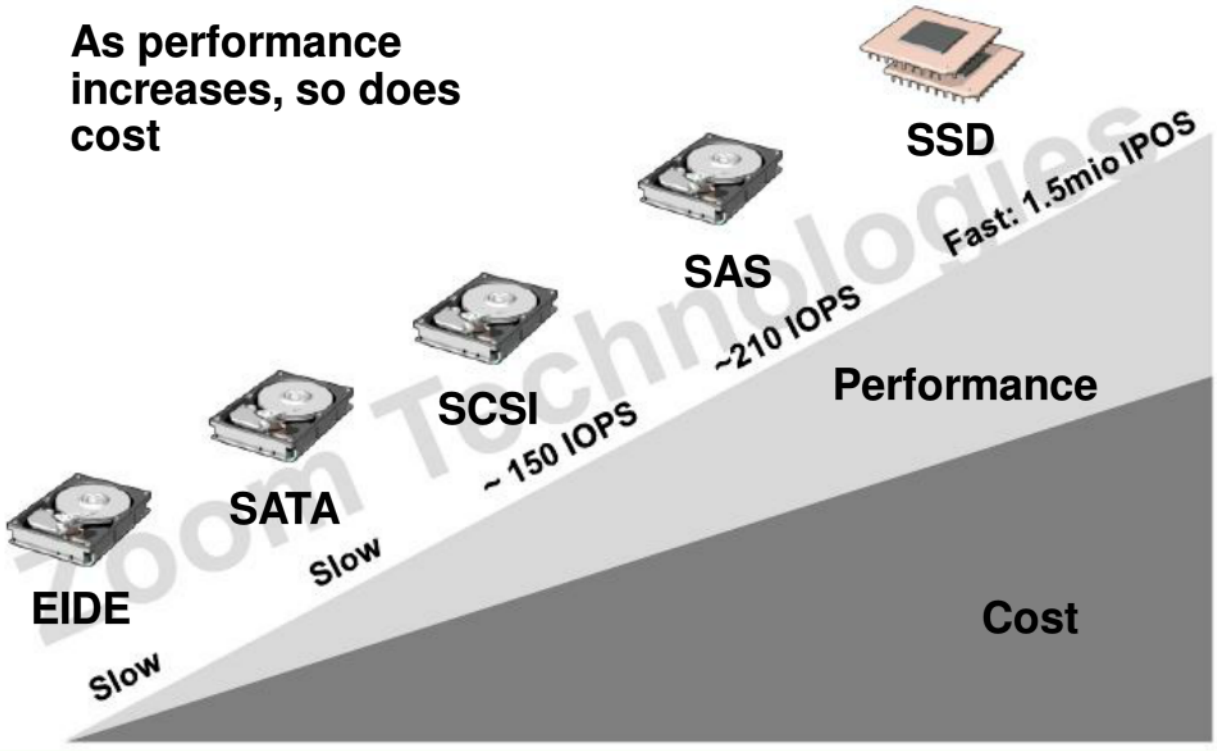
How Secure Sockets Layer Works

- An SSL Certificate enables encryption of sensitive information during online transactions.
- Each SSL Certificate contains unique, authenticated information about the certificate owner.
- A Certification Authority verifies the identity of the Certification owner when it is issued.

You need SSL if…

- You have an online store or accept online orders and credit cards
- You offer a login or sign-in on your site
- You process sensitive data such as address, date of birth, license etc
- You value privacy and expect others to trust you

Disk Types and Performance



Built-in Disk Management Tools

- **Built-in Disk Management Tools in Windows**

  Windows Server 2012

  – **Storage pools.**

  – **Disk Management.**

Selecting a Partition Table Format

MBR

- Standard Partition table format since early 1980s
- Supports a maximum of 4 primary partitions per drive
- Can partition a disk up to 2 TB

GPT

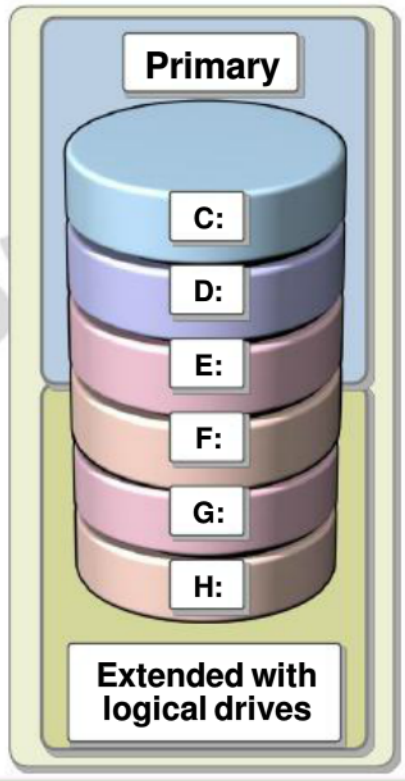
- GPT is the successor of MBR partition table format
- Supports a maximum of 128 partitions per drive
- Can partition a disk up to 18 EB

✓ Use MBR for disks smaller than 2 TB

✓ Use GPT for disks larger than 2 TB

What is a Partition?

- A physical disk is sectioned into separate partitions
- A physical disk can have up to three primary partitions and one extended partition
- Extended partitions are subdivided into logical drives



Selecting a File System

When selecting a file system, consider the differences between FAT, NTFS, and ReFS

FAT provides:

- Basic file system
- Partition size limitations
- FAT32 to enable larger disks
- exFAT developed for flash drives

NTFS provides:

- Metadata
- Auditing and journaling
- Security (ACLs and encryption)

ReFS provides:

- Backward compatibility support for NTFS
- Enhanced data verification and error correction
- Support for larger files, directories, volumes, etc.

What Is Direct Attached Storage?

DAS disks are physically attached to the server

Advantages:

- **Easy to configure**
- **Inexpensive solution**

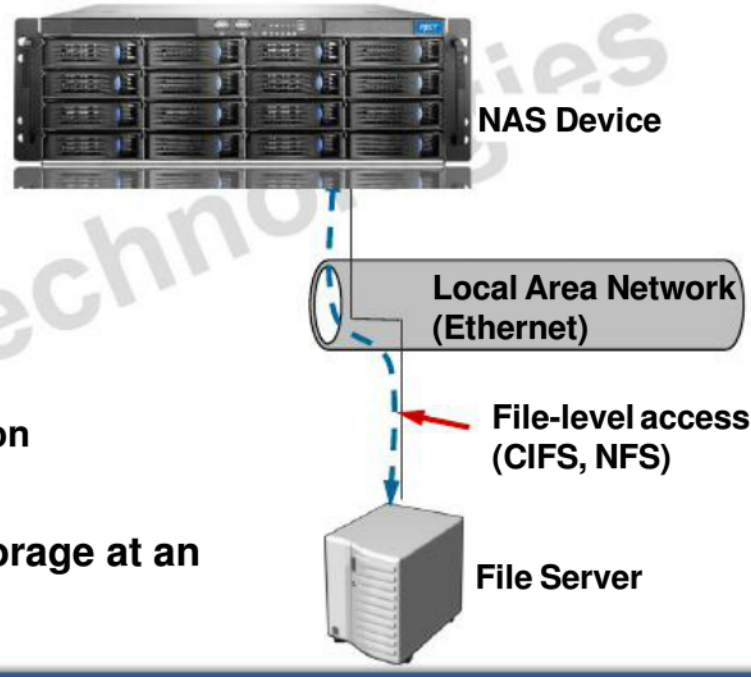
Disadvantages:

- **Isolated because it attaches only to a single server**
- **Slower**

Server with attached disks

What Is Network Attached Storage?

NAS is storage that is attached to a dedicated storage device and accessed through network shares



Advantages:

- Relatively inexpensive
- Easy to configure

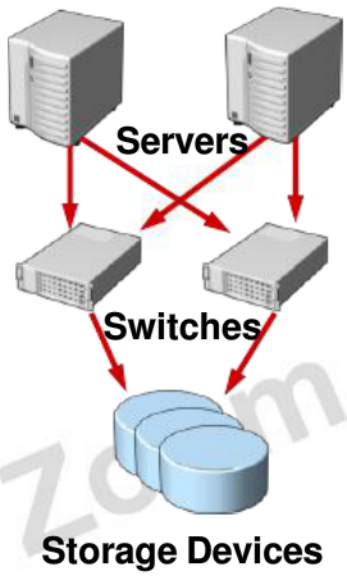
Disadvantages:

- Slower access times
- Not an enterprise solution

NAS offers centralized storage at an affordable price

What Is a SAN?

SANs offers higher availability with the most flexibility



Advantages:

- Fastest access times
- Easily expandable
- Centralized storage
- High level of redundancy

Disadvantages:

- More expensive
- Requires specialized skills

SANs can be implemented using Fibre Channel or iSCSI

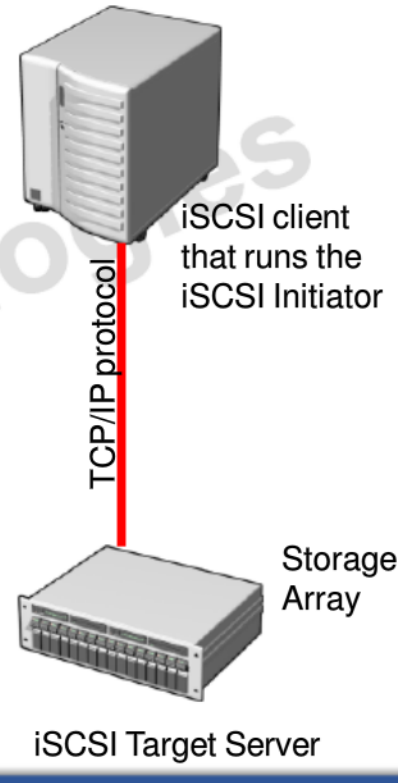
What is iSCSI storage ?

- **iSCSI storage is an inexpensive and simple way to configure a connection to remote disks. Many application requirements dictate that remote storage connections must be redundant in nature for fault tolerance or high availability.**

What is iSCSI storage ?

- **iSCSI transmits SCSI commands over IP networks**

Component	Description
IP network	Provides high performance and redundancy
iSCSI targets	Run on the storage device and enable access to the disks
iSCSI initiators	A software component or host adapter on the server that provides access to iSCSI targets
IQN	A globally unique identifier used to address initiators and targets on an iSCSI network



iSCSI Target Server and iSCSI Initiator

The iSCSI target server	The iSCSI initiator
Is available as a role service in Windows Server 2012 Provides the following features: - Network/diskless boot - Server application storage - Heterogeneous storage - Lab environments	Runs as a service in the operating system Is installed by default on Windows 8 and Windows Server 2012

What Is RAID?

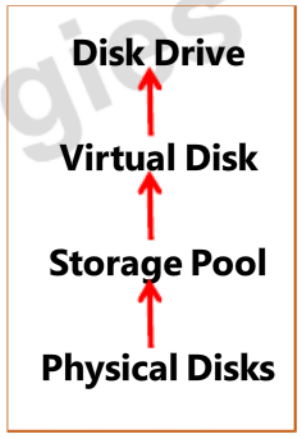
- RAID combines multiple disks into a single logical unit to provide fault tolerance and performance
- RAID provides fault tolerance by using:
  - Disk mirroring
  - Parity information
- RAID can provide performance benefits by spreading disk I/O across multiple disks
- RAID can be configured using several different levels
- RAID should not replace server backups

What Is the Storage Spaces Feature?

Use storage spaces to add physical disks of any type and size to a storage pool, and then create highly-available virtual disks from the storage pool

To create a virtual disk, you need the following:

- One or more physical disks
- Storage pool that includes the disks
- Virtual drives that are created with disks from the storage pool
- Disk drives that are based on virtual drives



Virtual drives are not virtual hard disks (VHDs); they should be considered a drive in Disk Manager

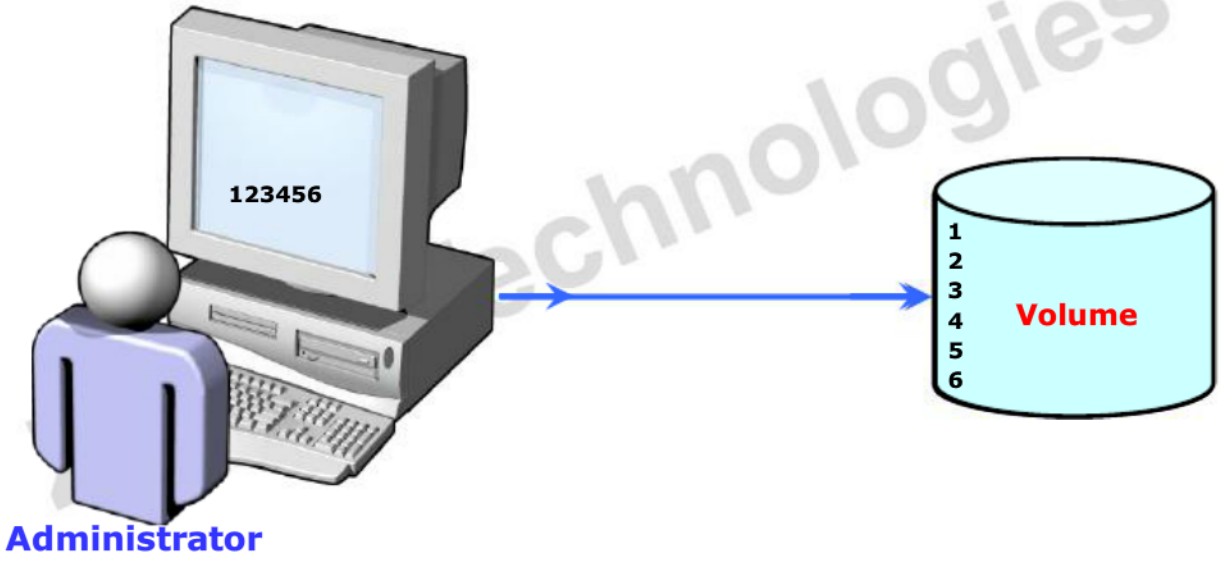
What Is Fault Tolerance?

- The ability to survive hardware failure
- Fault-tolerant volumes provide data redundancy
- Fault-tolerant volumes are not a replacement for backup

What Is a Simple Volume?

- Contains space on a single disk
- Can be extended if formatted with NTFS
- Spanning is not available
- Fault tolerance is not available
- Read & write speed is normal

How Simple Volume works?



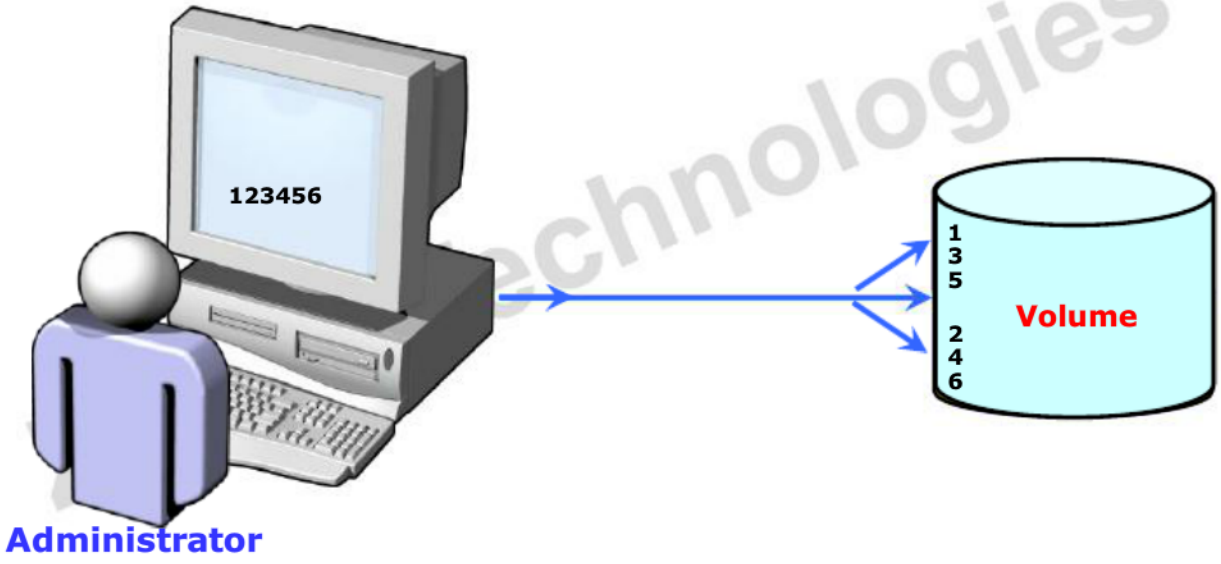
Types of RAID Volumes in Windows 2012

- Simple Volume (RAID-0)
- Mirrored Volume (RAID-1)
- RAID-5 Volume (Striped With Parity)

What Is a Simple Volume (RAID-0)?

- Minimum - 2 Hard Disks
- Data is written alternately and evenly to two or more disks
- Spanning is available
- Fault Tolerance is not available
- Read & Write Speed is Fast

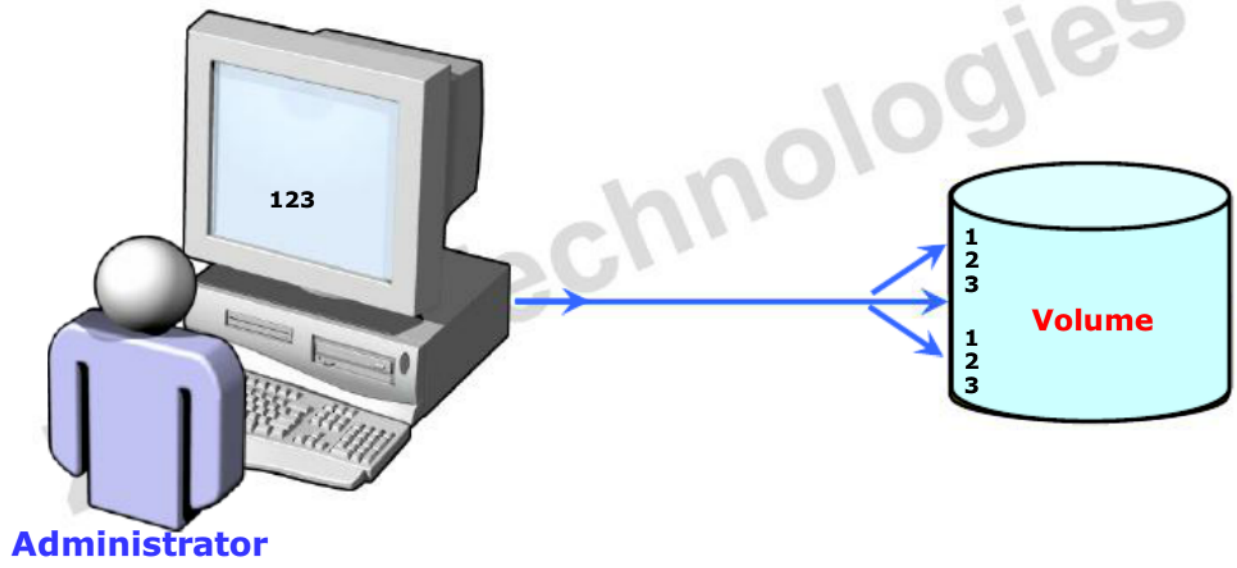
How RAID-0 works?



What Is a Mirrored Volume (RAID-1)?

- Minimum - 2 Hard Disks
- Simultaneously data will be written to two volumes on two different disks
- Any volume can be mirrored including the system and boot volumes
- Fault Tolerance is available
- Read Speed is Fast & Write Speed is Slow
- 50% overhead

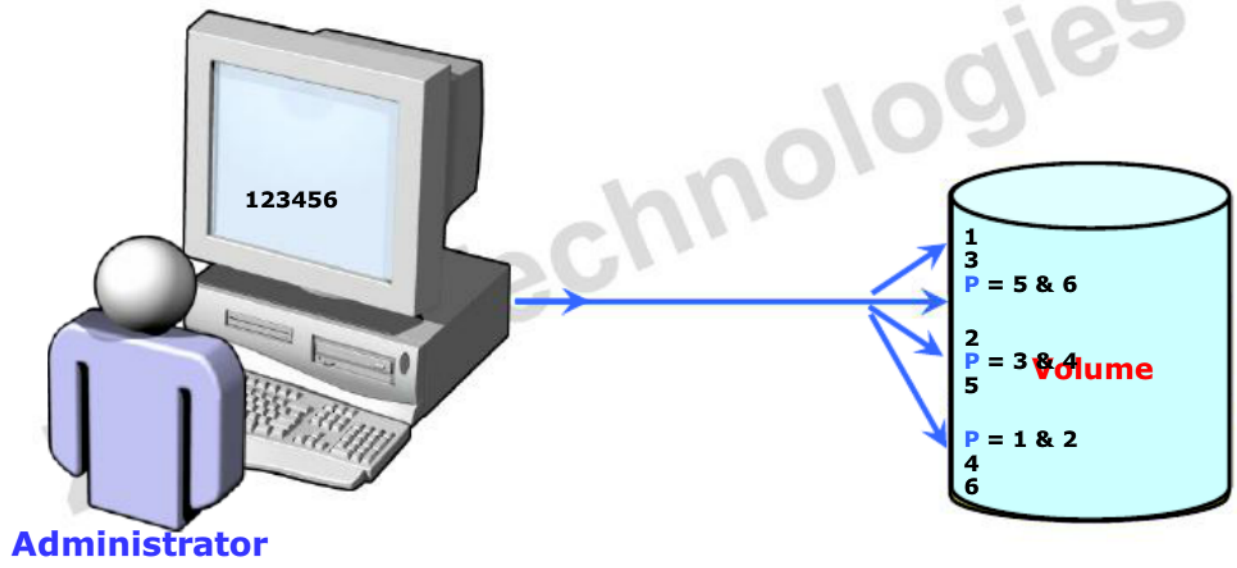
How RAID-1 works?



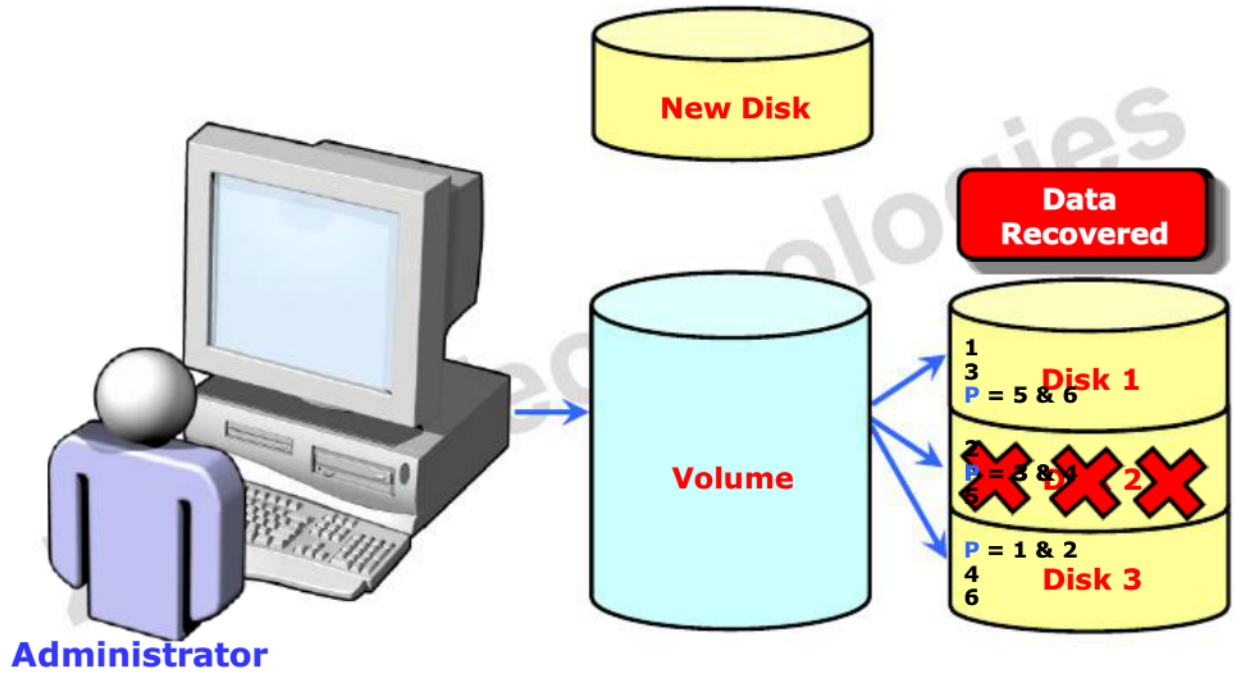
What Is a Parity (RAID-5) Volume?

- Minimum - 3 Hard Disks
- Data is written alternately and evenly to two or more disks and a parity is written on one disk
- Fault Tolerance is available
- Read & Write Speed is Fast,

How RAID-5 works?



What will happen ?



What Are Mount Points and Links?

A mount point is a reference to a location on a disk that enables Windows operating system access to disk resources

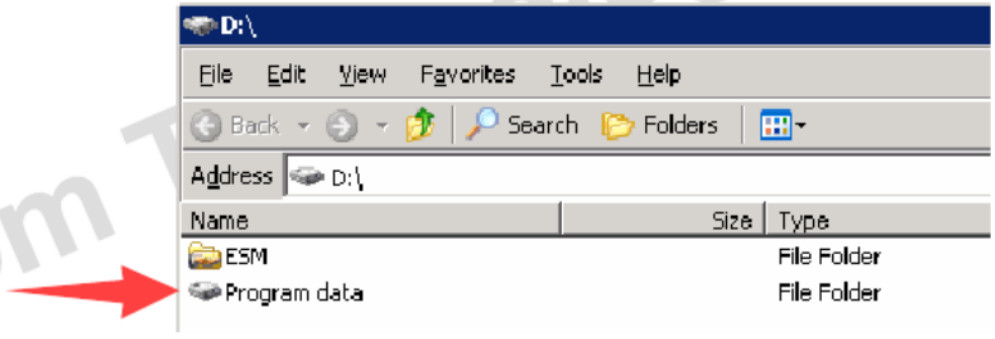
- **Use volume mount points:**
  - To mount volumes or disks as folders instead of using drive letters
  - When you do not have drive letters available for creating new volumes
  - To add disk space without changing the folder structure

A link file contains a reference to another file or directory

- **Link options:**
  - Symbolic file link (or, soft link)
  - Symbolic directory link (or, directory junctions)

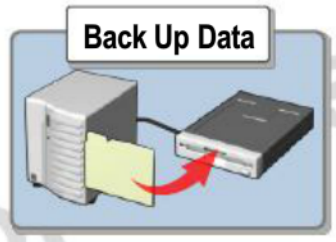
What Is a Mounted Drive?

- Is assigned a path rather than a drive letter
- Allows you to add more drives without using up drive letters
- Adds volumes to systems without adding separate drive letters for each new volume

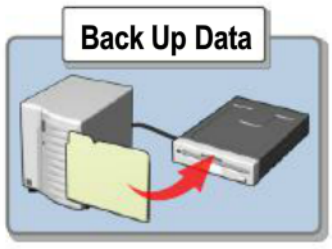


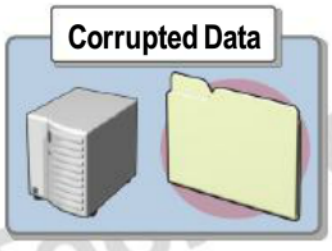
What is Backup?

- Copy data to alternate media
- Prevent data loss
- Only Administrators can backup the data

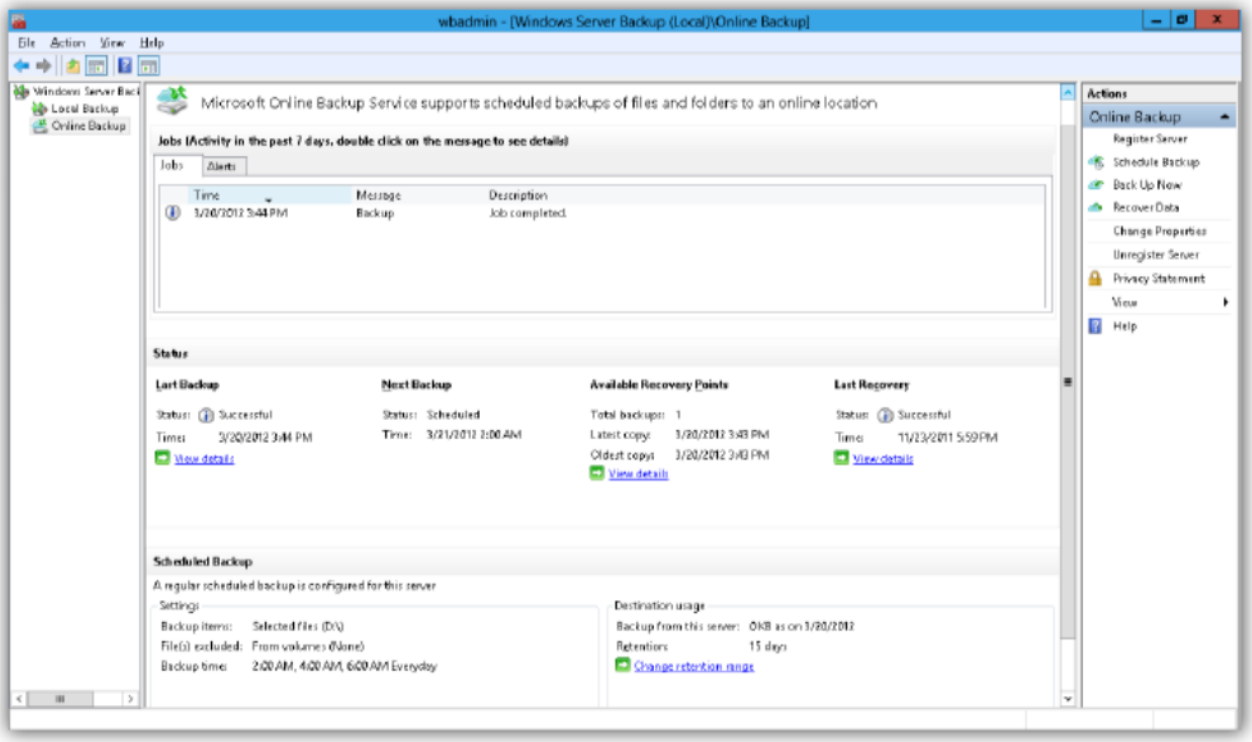


Backup

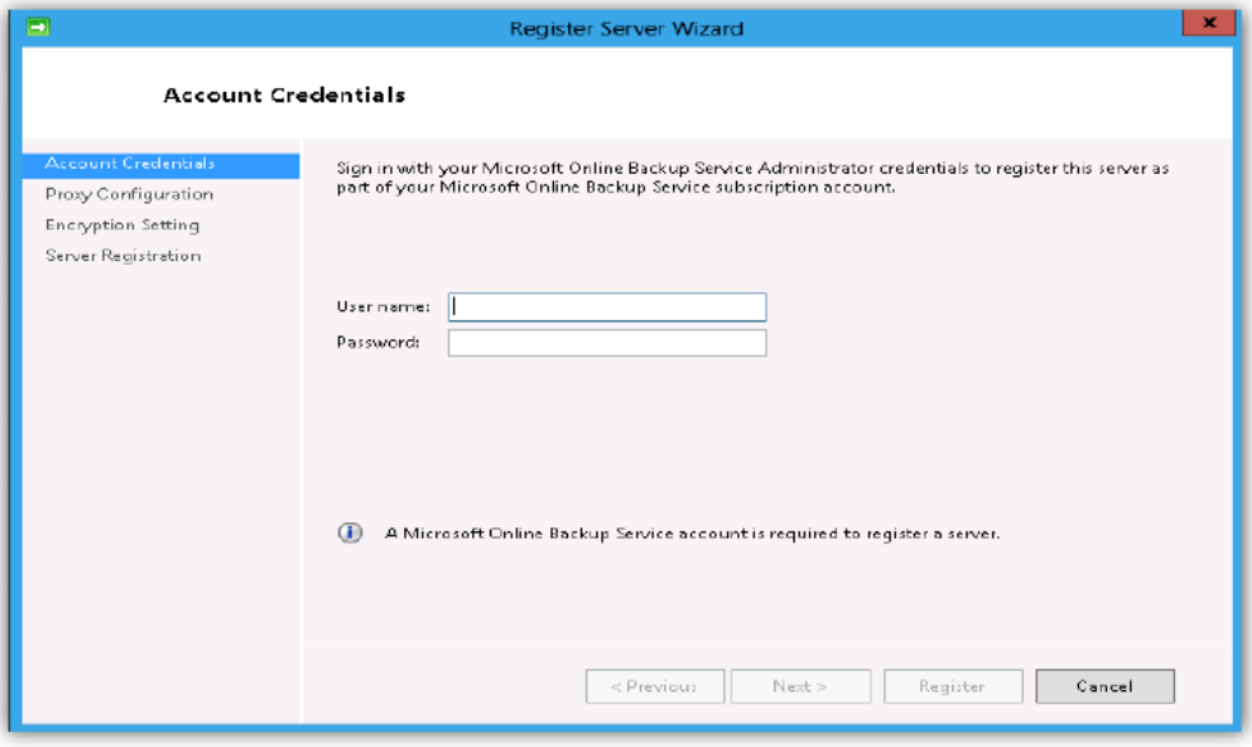




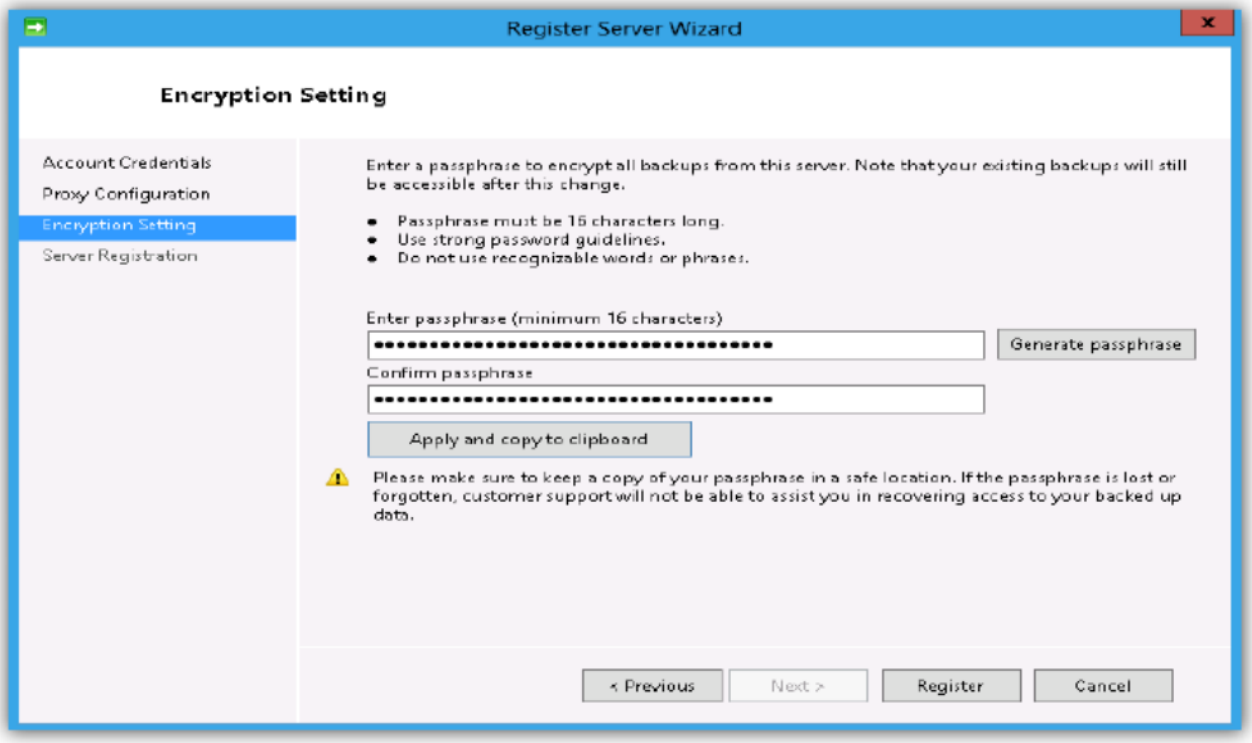
Windows Backup Admin



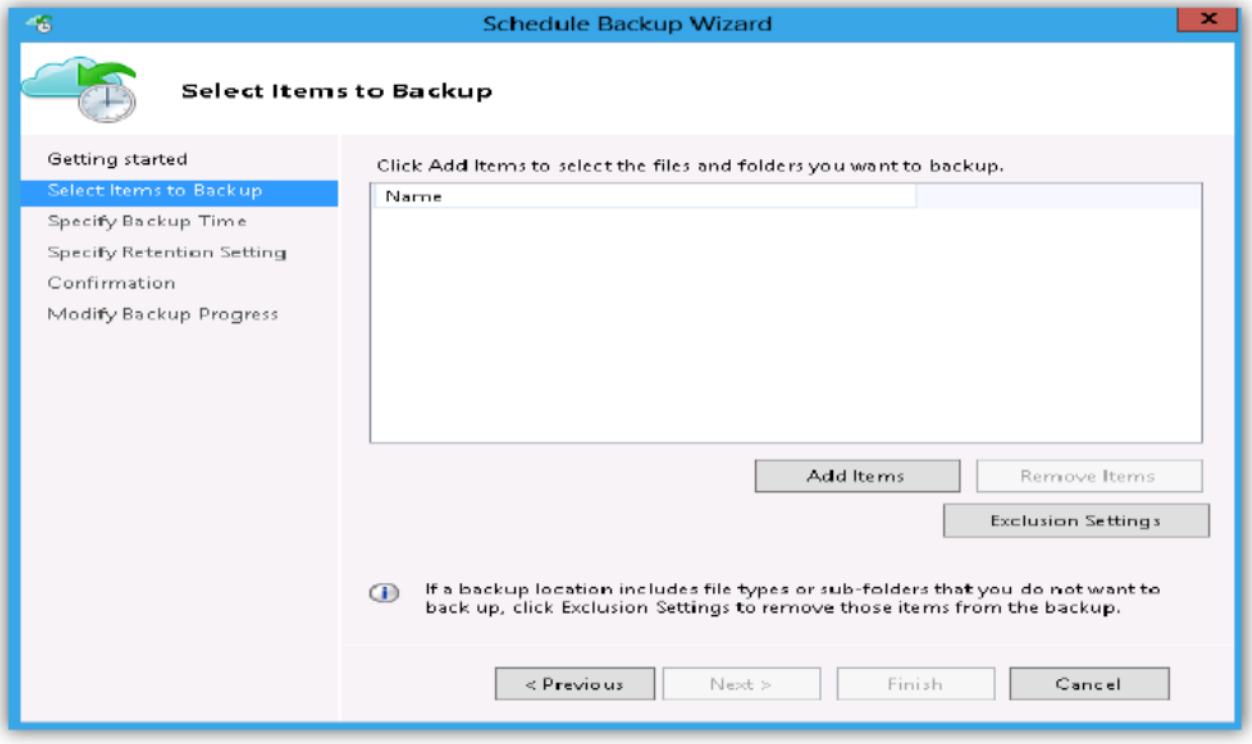
Online Backup - Register Server



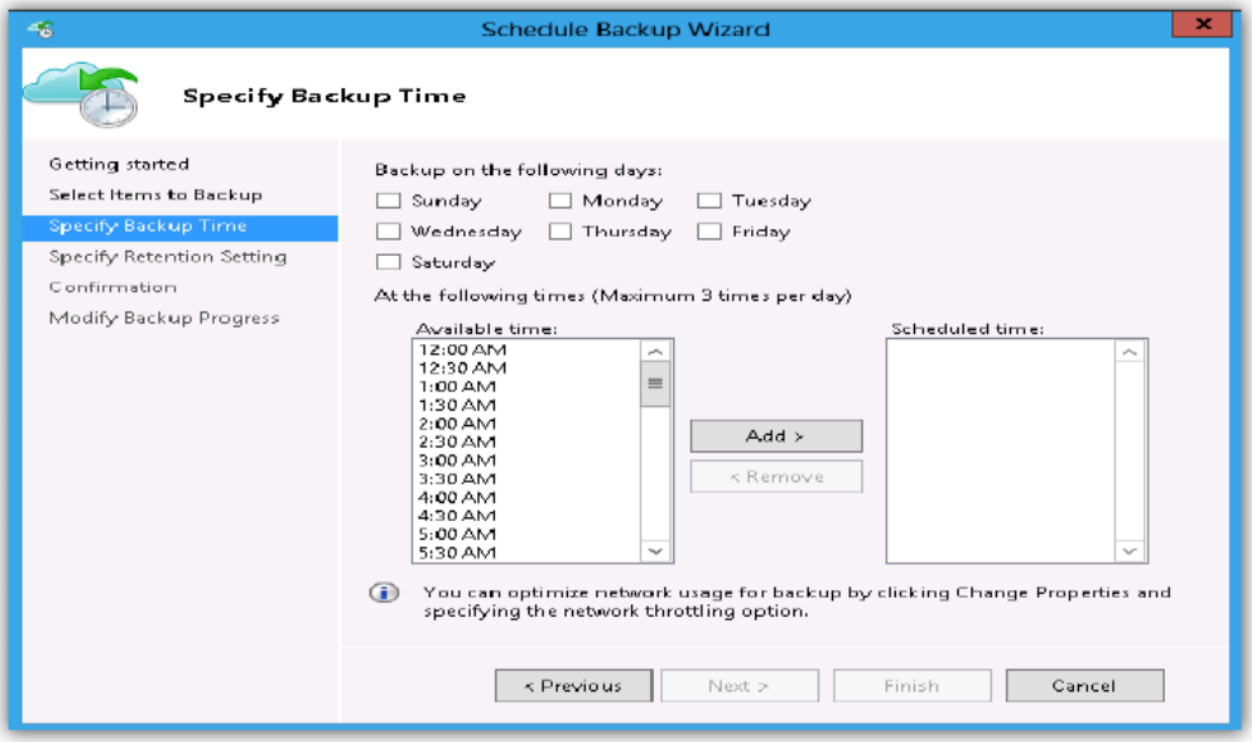
Online Backup - Register Server



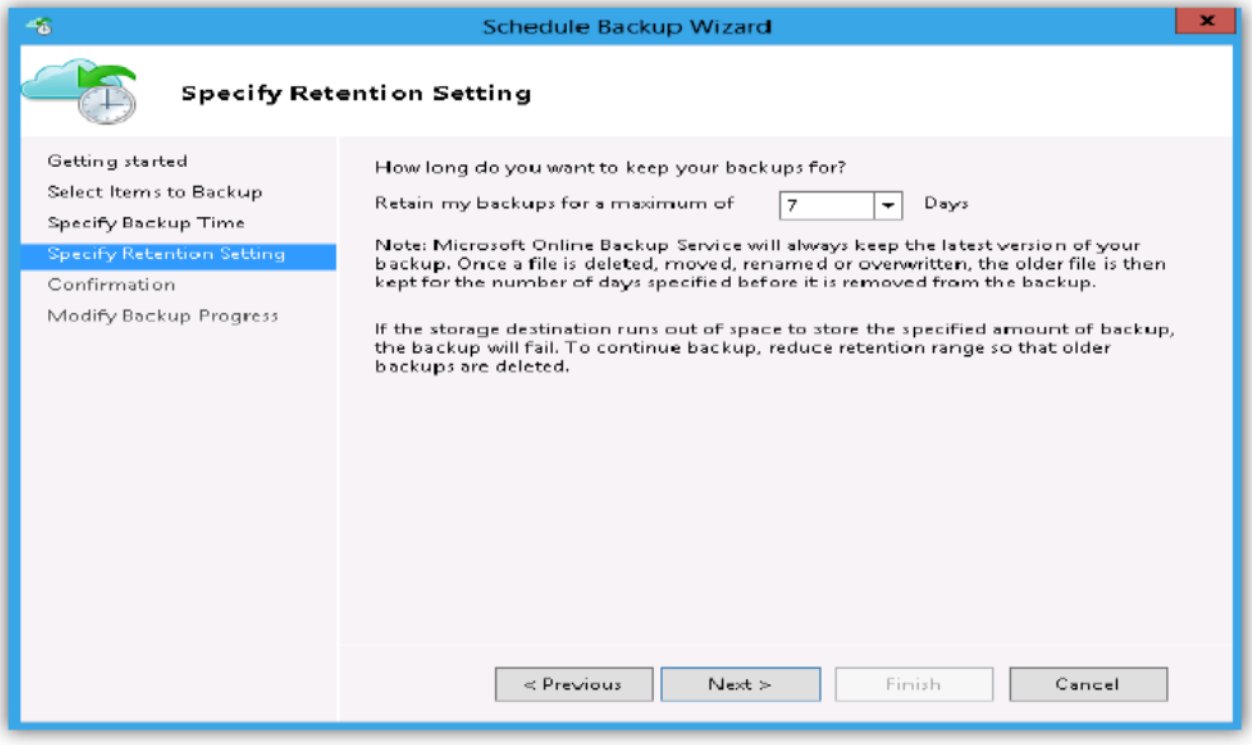
Online Backup - Schedule Backup



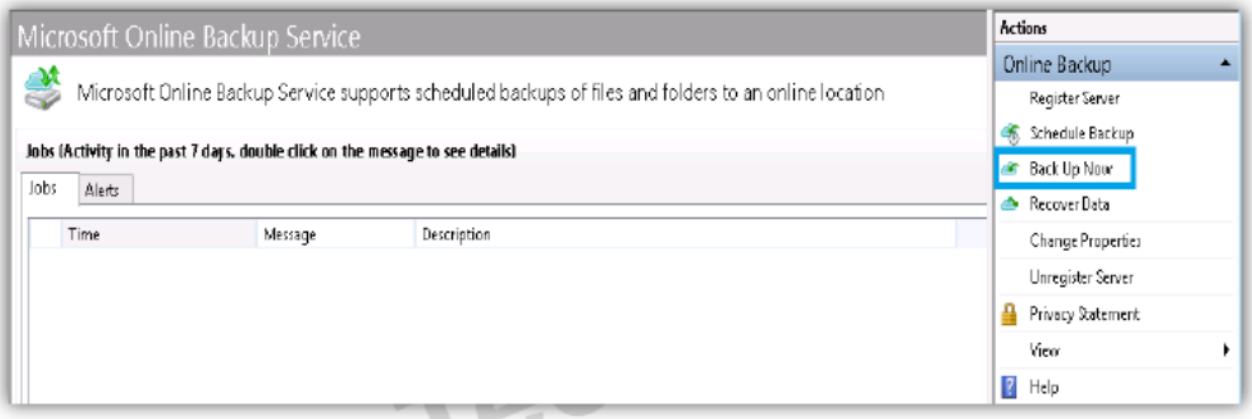
Online Backup - Schedule Backup



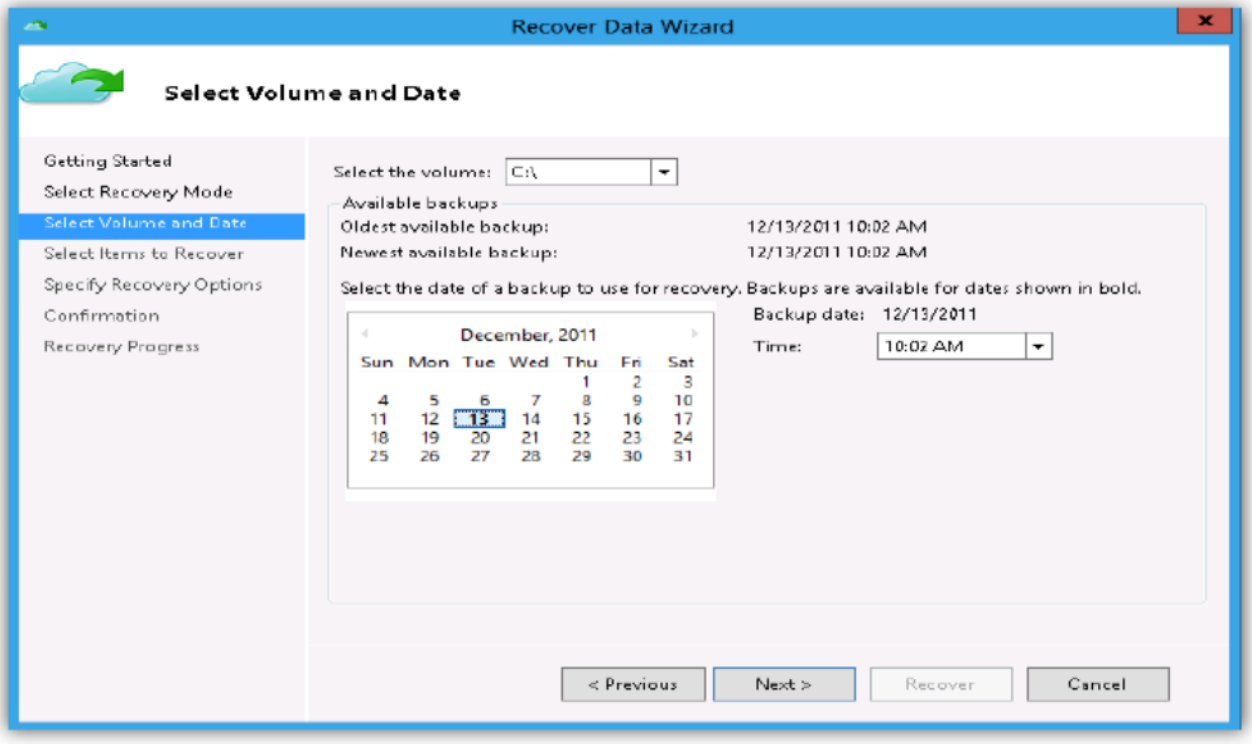
Online Backup - Schedule Backup



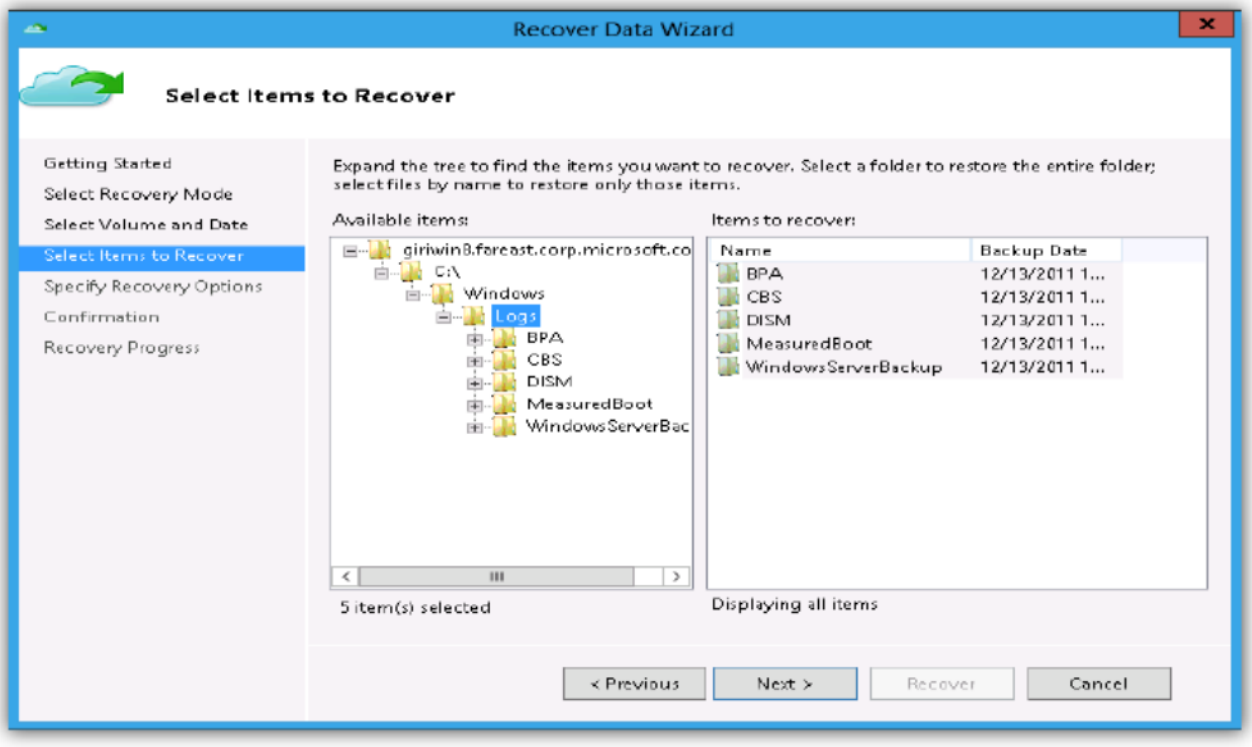
Online Backup - Backup Now



Online Backup - Recover Data



Online Backup - Recover Data



ACTIVE DIRECTORY

- Domain Services (AD-DS)
- Lightweight Directory Services (AD-LDS)
- Rights Management Services (AD-RMS)
- Federation Services (AD-FS)
- Certificate Services (AD-CS)

Lightweight Directory Services (AD-LDS)

- AD LDS Provides an LDAP accessible directory service that supports identity management scenarios
- Removes all other AD DS features
  - No Kerberos authentication
  - No forests, domains, DC, GC, sites, group policies
  - No dependency on DNS
- Each AD LDS server can host multiple directory stores (i.e. instances)

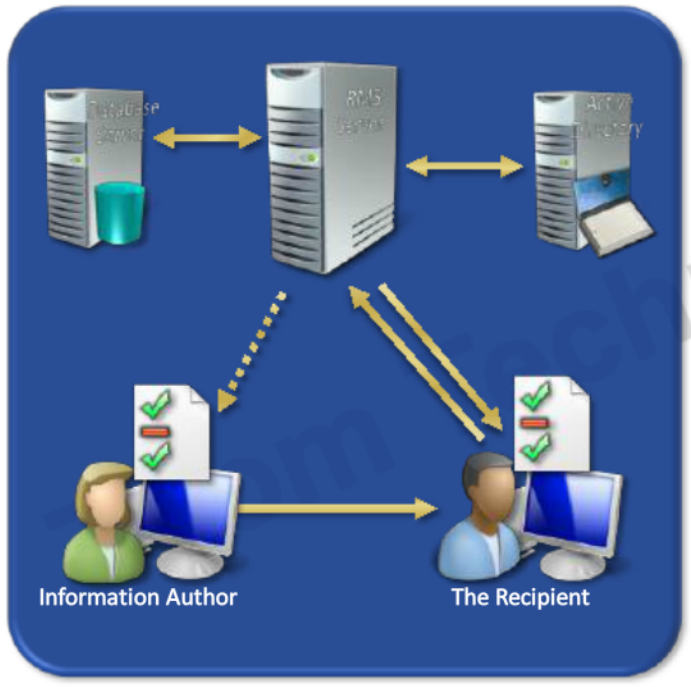
Lightweight Directory Services (AD-LDS)

- Within each instance
  - Schema partition
  - Configuration partition
  - Zero or more application partitions

Rights Management Services (AD-RMS)

- RMS enables customers to keep internal information internal
  - Confidential files protection
  - E-mail forwarding
  - Web applications
- Benefits:
  - Safeguards sensitive internal information
  - Digitally enforces organization policies
  - Persistently protects information

Rights Management Services Work flow

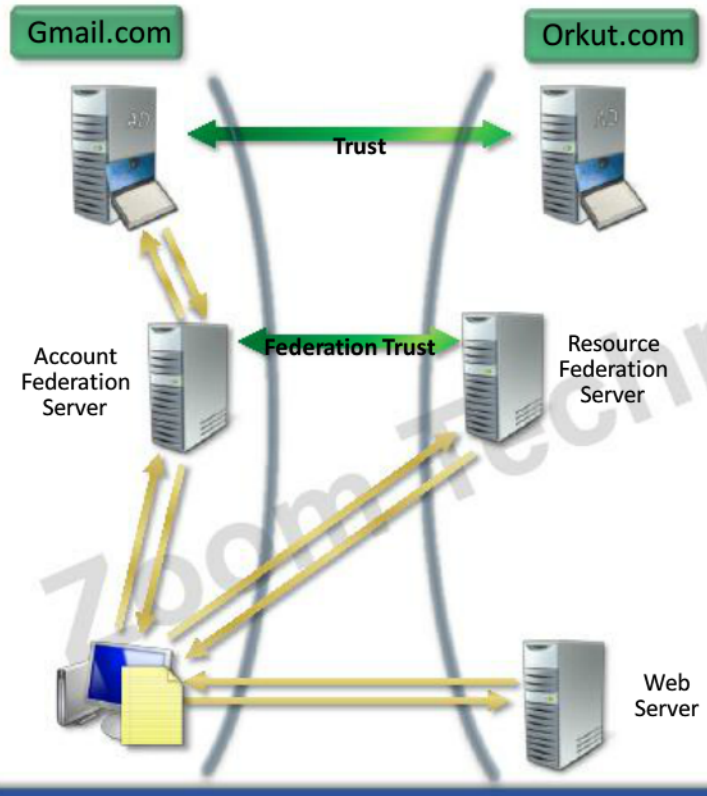


- Author receives a client license certificate the "first time" they right-protect the information.
- Author defines a set of usage rights and rules for their file & creates a "publishing license" to encrypt file.
- Author distributes file.
- Recipient opens the file, the application calls the RMS server which validates the user and issues a "use license."
- Application opens the file and enforces rights.

Federation Services (AD-FS)

- AD FS provides an identity access solution
- AD FS is a service that allows for the creation of federated relationships between organizations for web application authentication
- Deploy federation servers in multiple organizations to facilitate business-to-business (B2B) transactions
- AD FS provides a Web-based Single Sign-On (SSO) solution
- AD FS improved in Windows Server 2008

Federation Services (AD-FS)



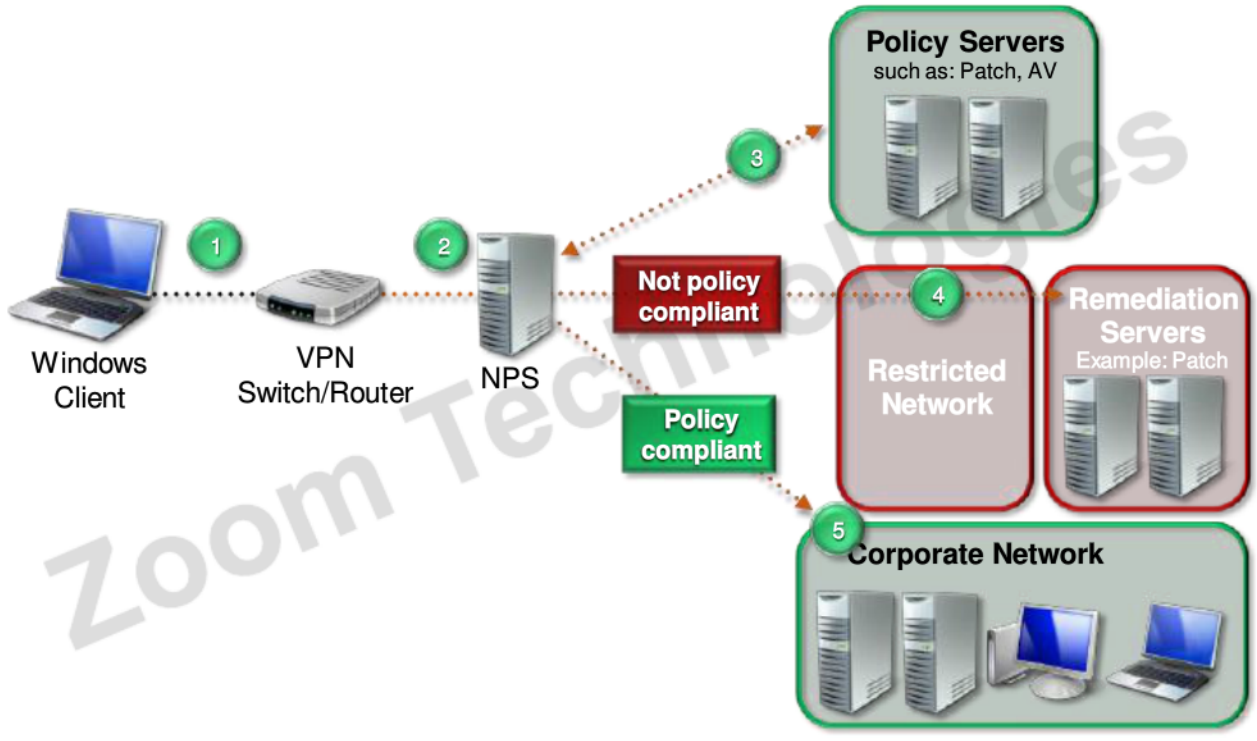
- Client contacts Web server to access web page
- Web SSO agent intercepts request
- Client is redirected to FS-R for discovering the resource
- Client is redirected to FS-A for authentication
- FS-A sends the request to Domain Controller and authenticates user
- Client is redirected back to FS-R
- Web SSO agent intercepts request, checks authentication, and sends request to Web server

Certificate Services (AD-CS)

- AD CS Provides PKI certificate issuance and management services
- Not significantly different than CS in 2003
- Provides a certificate issuance and Certification Authority (CA) service
- Issues Digital certificates to web server for Secure data transfer (HTTPS)

- What is Network Access Protection?
- Health Policy Validation
- Health Policy Compliance
- Ability to Provide Limited Access
- Enhanced Security

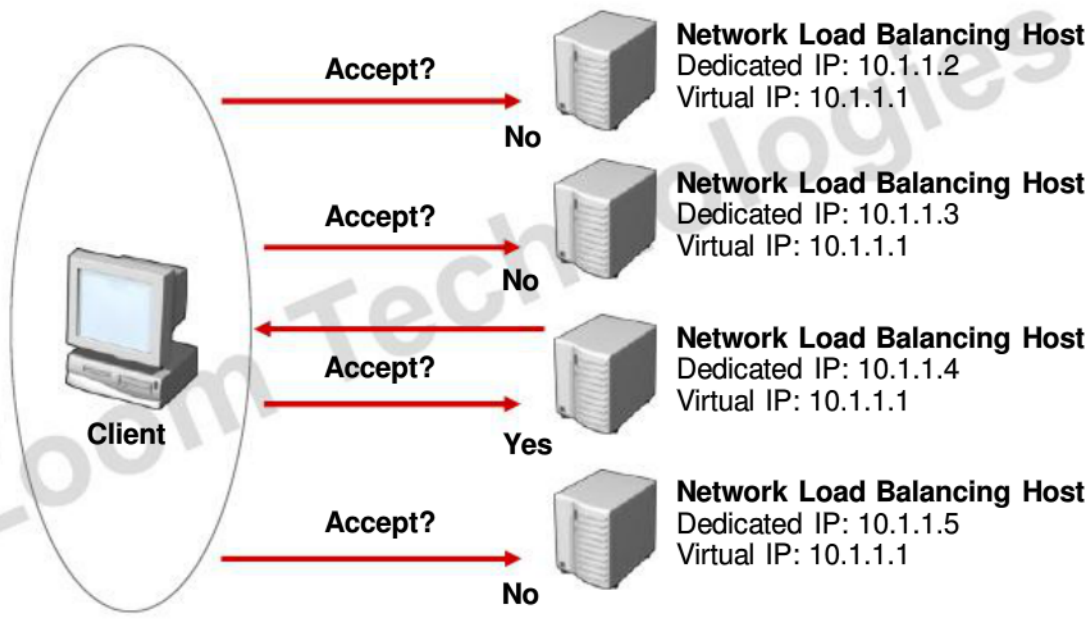
How Network Access Protection works?



Network Load Balancing

- Network Load Balancing (NLB) uses a distributed algorithm to balance IP traffic load across multiple hosts. It helps to improve the scalability and availability of business-critical, IP-based services.
- NLB also provides high availability, because it detects host failures and automatically redistributes traffic to surviving hosts.
- Windows Server 2012 NLB clusters can have between 2 and 32 nodes.
- Balances traffic based on node utilization
  - New traffic will be directed to the node that is being utilized the least
  - You can configure NLB to preference some nodes over others

How NLB Works

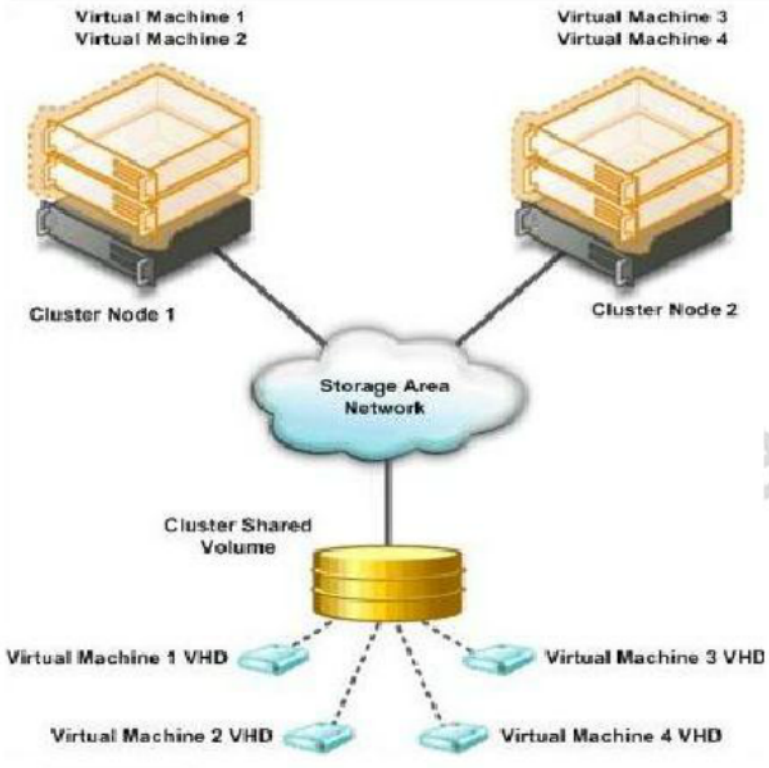


Server Failures and Recovery

- NLB cluster heartbeats are transmitted every second between nodes in a cluster
- Convergence occurs when:
  - A node misses five consecutive heartbeats, at which time it is automatically removed from an NLB cluster
  - A node that was member of a cluster returns to functionality
  - An administrator adds or removes a node manually

- Failover clusters in Windows Server 2012 provide a high-availability solution for many server roles and applications.
- By implementing failover clusters, you can maintain application or service availability if one or more computers in the failover cluster fails.
- A failover cluster is a group of independent computers that work together to increase the availability of applications and services.
- Physical cables and software connect the clustered servers, known as nodes.
- If one of the cluster nodes fails, another node begins to provide service. This process is known as failover. With failover, service disruptions are minimized.

Failover cluster



What Is High Availability?

- One of the most important characteristics of any Information Technology (IT) system is availability. Availability refers to a level of service that applications, services, or systems provide.
- Availability is expressed as the percentage of time that a service or system is available. Highly available systems have minimal downtime, whether planned or unplanned, and they usually need to be available on a 24-hour-a-day basis.
- These systems are typically available more than 99 percent of the time, depending on the organization's needs and budget

- Increased scalability. In Windows Server 2012, a failover cluster can have 64 physical nodes and can run 8,000 virtual machines on each cluster

What Are CSVs?

- In a classic failover cluster deployment, only a single node at a time controls a LUN or a volume on the shared storage.
- This means that the other nodes cannot see shared storage until each node becomes an active node. CSV is a technology introduced in Windows Server 2008 R2 that enables multiple nodes to share a single LUN concurrently.
- Each node obtains exclusive access to individual files on the LUN instead of the entire LUN.
- In other words, CSVs provide a distributed file access solution so that multiple nodes in the cluster can simultaneously access the same NTFS file system

Quorum

- Quorum is the number of elements that must be online for a cluster to continue running. In effect, each element can cast one vote to determine whether the cluster continues to run.
- Each cluster node is an element that has one vote.
- In case there is an even number of nodes, then an additional element, which is known as a witness, is assigned to the cluster.
- The witness element can be either a disk or a file share. Each voting element contains a copy of the cluster configuration; and the Cluster service works to keep all copies synchronized at all times

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